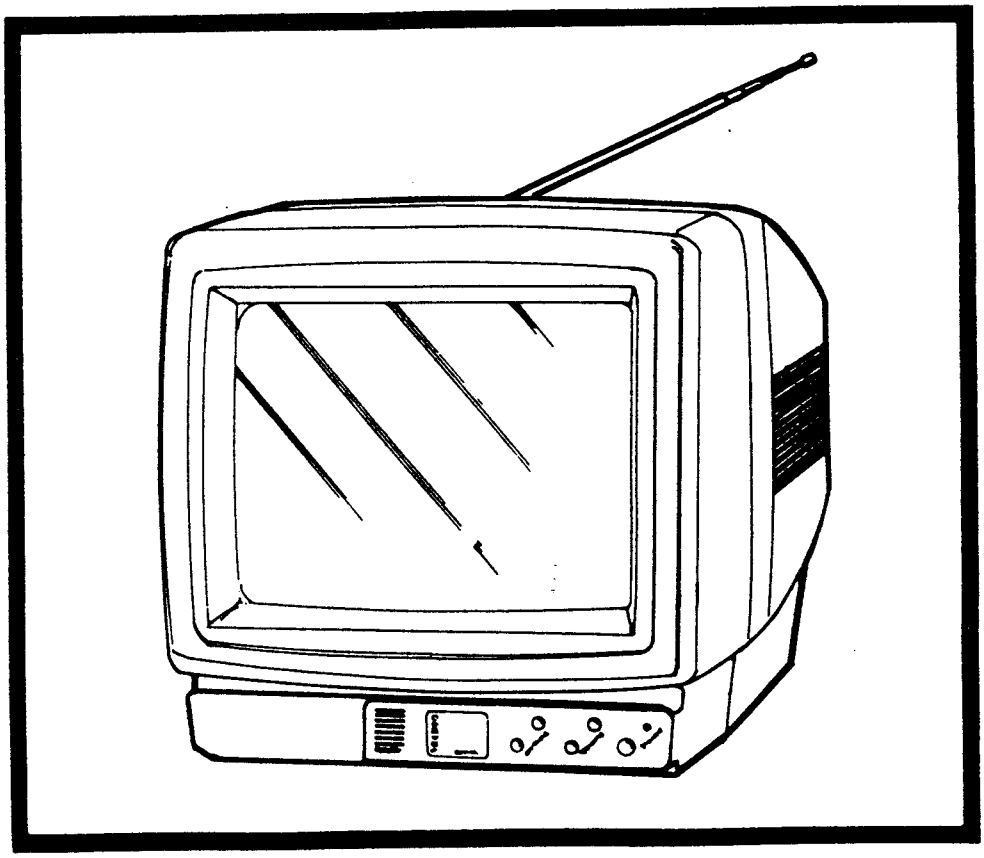
Service Manual

10" COLOR TV WITH REMOTE CONTROL

MARK®

PAL-B/G



SPECIFICATIONS

INPUT POWER RATING	: 40 Watts(nominal)DC 12V
ANTENNA INPUT IMPEDANCES	: Telescopic antenna for VHF & UHF
RECEIVING CHANNELS	: VHF LOW N1-S2 HIGH S3-S20 UHF E21-E69
INTERMEDIATE FREQUENCIES	: PIF 38.9MHZ SIF 33.4 MHZ
PICTURE TUBE	: 2 7GDC85X-TC
DIMENSION	: 316(D) x 264(H) x 268(W)
SPEAKER	: 1 Watts 16ohm(72m/m)

SERVICE NOTES

1. When replacing parts or circuit boards, clamp the lead wires to terminals before soldering.
2. When replacing a high wattage resistor (oxide metal FIILM resistor) in circuit board, keep the resistor 10 mm(1/2 in.) away from circuit board.
3. Keep wires away from high voltage or high temperature components.
4. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the chassis parts list.

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SAFETY INSTRUCTIONS

WARNING : BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION," "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

■ X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 1 7K volts at zero beam current (minimum brightness) under 230VAC power source. The high voltage must not, under any circumstances, exceed 1 8K volts Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure on page 8 of this manual. It is recommended the reading of the high voltage be recorded as a parts of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.

■ PRODUCT SAFETY NOTICE

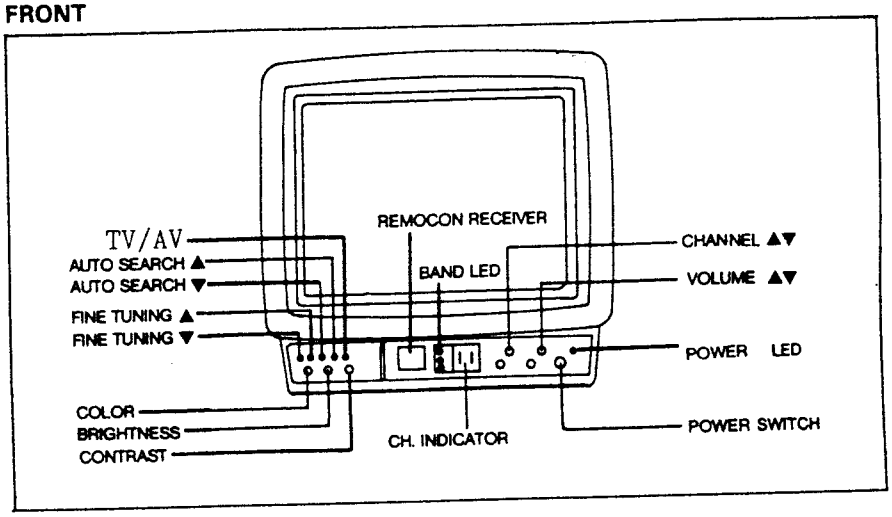
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified by shading on the schematic diagram and the parts list.
Before replacing any of these components, read the parts list in this manual carefully. The used of substitute replacements parts which do not have the same safety characteristics as specified in the parts list may create X-RAY RADIATION.

■ SAFETY PRECAUTION

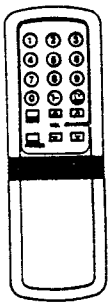
1. Potentials as high as 16,000 volts are present when this receiver is operation. Operation of the receiver outside the cabinet or with the back board removed involves a shock hazard from the receiver.
   1) Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions nesessary when working on high-voltage equipment.,
   2) Always discharge the picture tube anode to the receiver chassis to keep off the shock hazard before removing the anode cap.
   3) Perfectly discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the Replacement parts list.
3. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10mm away from circuit board.
4. Keep wires away from high voltage or high temperature components.
5. This receiver must operate under AC 230volts, 50Hz NEVER connect to DC supply or any other power or frequency.

LOCATION OF CONTROL

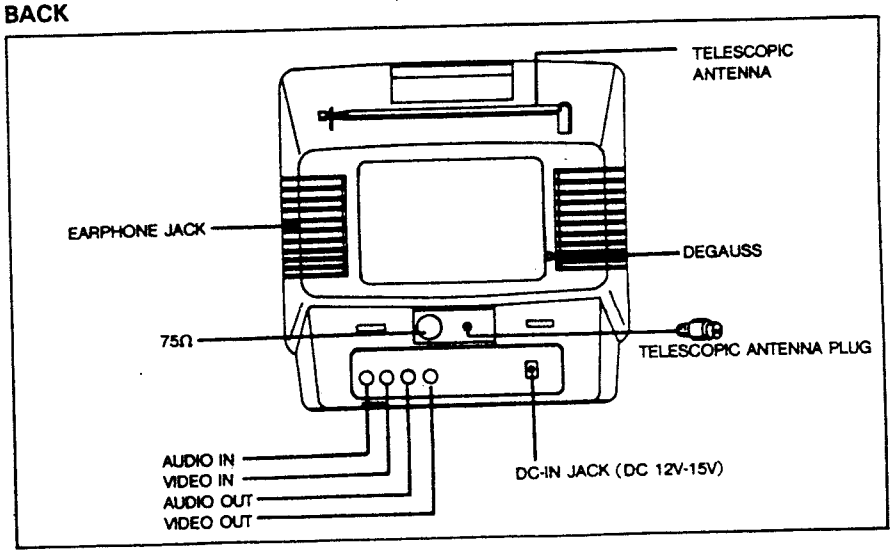
FRONT



REMOTE CONTROLLER



BACK



INSTRUCTION OF KA2919

1. VIDEO IF.

(1) Surface Acoustic Wave Filter

Since both the tuner and IC201 are high-gained circuits, and additional pre-amplifier for the surface acoustic wave filter SAW201 is not required.

The output of the tuner IF is fed via the input circuit L203-R203 to the SAW-filter. Since the input impedance of IC201 is approximately 2K ohm, T201-R209 C208 are provided for the matching to high impedance.

(2) Internal Block Diagram of KA2919

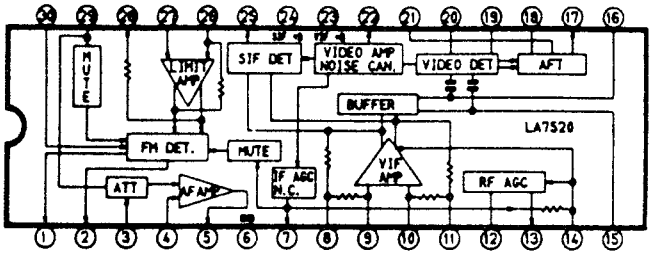


Figure 2. Internal Block Diagram of KA2919

(3) VIF Amplifier

The IF signal wave-shaped by SAW201 is fed to pin 9 and pin 10. The input sensitivity of IC201 is 36dBm nominal. The output of the VIF amplifier is fed via the buffer stage and the sound trap at pin 15 and pin 16 to the low level detector. If the sound trap is not provided, the ratio of P/S must be compensated. Otherwise, 920KHz beat noise may appear on the picture and the S/N ratio of sound becomes worse.

(4) Video Detection

Differentially amplified, IF signal is then fed to the video detector.

C212 is for AC bias of DC negative feedback of the VIF amplifier.

T203 and R225 compose an LC tank circuit which is tuned in the video carrier frequency, so that the video signal with sync is detected.

(5) Video Amplifier

The video output via internal video amplifier and the noise canceller is provided at pin 22.

The output voltage at the pin 22 is normally 6.1V when no signal is inputted. The level of sync is 3.6V.

R224 is a bais resistor. The peaking level can be defined by the resistance of R228. L207 and CF205 are provided as a sound trap, and are tuned to 4.5MHz.

(6) A.G.C.

Peak detected signal by the internal AGC detector charges and discharges C211, and the voltage is fed back to the internal VIF amplifier for the gain control.

R219 and C215 are provided for the time constant, and are also designed for the high speed of responses.

The delay point of RF AGC is adjusted by SVR201, and the output of RF AGC is provided at pin 13 IC201.

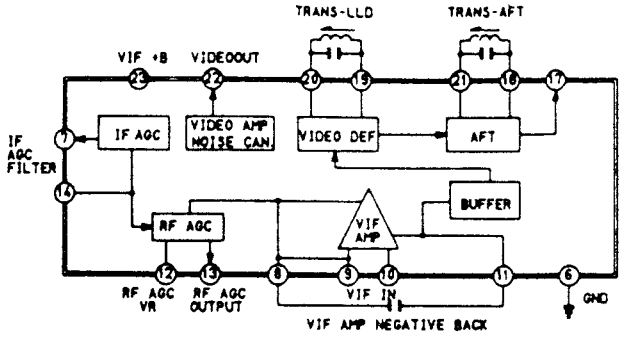


Figure 3. Internal Block Diagram of KA2919 PIF Part

The maximum voltage of RF AGC is 9V and the minimum is 0V.

R214 and R215 comprise a voltage divider.

C214 is provided to prevent any oscillation. Both of RF AGC and IF AGC are reversed AGC, so that the output voltage decreases when the input level increases.

(7) A.F.T.

AFT system in KA2919 is a Quadrature detection circuit. The LC tank T204 is connected to pin 18 and pin 21. AFT on-off switch may be customarily provided as shown in Figure 4. This feature is desirable for facilitating the tuning in of comparatively weak stations.

The AFT system should be turned off to tune in the weak station. The turn the AFT system on to obtain capture. Thereafter, the AFT system will continue to lock in on the weak station.

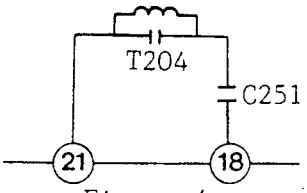


Figure 4.

The DC voltage between pin 18 and pin 21 is 4V. The AFT on-off switch reduces the voltage between pin 18 and pin 21 below 0.7V so that the signal from those pins can be cut off.

C251 are provided as a trap to prevent from a misoperation.

The output of AFT from the current mirror circuit is provided at pin 17 and is supplied ria R237 to the tuner as shown in Figure 5. The maximum voltage at pin 17 is 11.5V nominal and the minimum is 0.4V nominal.

The load resistors R236 and R226 divide the voltage so that the slope of AFT can be selected accordingly C227 is for decoupling and R237 is for AFT range setting.

A Varactor diode in the tuner controls the oscillation frequency in accordance with the voltage supplied.

when higher voltage is supplied, the capacitance reduces and the oscillation frequency increases.

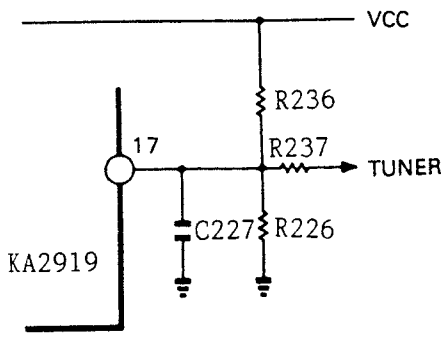


Figure 5.

2. SOUND

(1) SIF Detection

The output of the internal VIF amplifier is fed to the internal SIF detector, while the output of the internal VIF amplifier after buffer is fed via the sound trap at pin 15 and pin 16 to the low level detector.

The output of the first SIF detection is provided at pin 25 and is fed via the buzz canceller 4.5MHz filter CF201 to the internal limiter.

C218 and C221 are bypass capacitors.

(2) FM Detection

The output of the limiter is fed to the FM detector. FM detector is Quadrature detection circuit so that the signal from pin 1 is 90 degree phaseshifted and is fed pin 30. CF207 is a part of the discriminator.

R211 and R220 are provided for the frequency band characteristic and the anti-distortion.

Since C216 controls the DC level for AC output, the level should be equal to DC output when no signal is applied. The output of FM detection is provided at pin 2.

(3) AF Amplifier

The output of FM detector is fed via the De-emphasis circuit to the internal attenuator.

The range of the attenuation is maximum 30 dB.

R213 and C209 compose the De-emphasis.

The output of the attenuator is fed to the internal AF amplifier and pin 4 is provided for NFB from the sound output. The gain of the AF amplifier can be adjusted by R217,218 and the AC component must be cut and grounded by C234 and R217,218.

The maximum output voltage of the AF amplifier is 2Vrms nominal.

The AF signal is fed to the output transistors Q205 and Q206, which comprise a SEPP amplifier.

(5) Power Supply

The power for the VIF block is supplied to pin 23 and the power fot the SIF block is supplied via the decoupling resistor R223. C225 and C224 are for voltage smoothing.

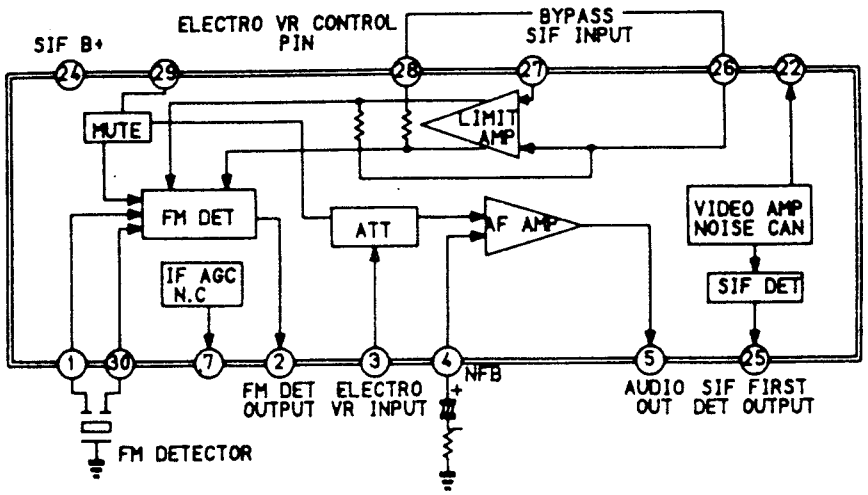


Figure 6. Internal Block Diagram of SIF Part

INSTRUCTION OF M51390ASP

(1) IC M51390ASP

IC M51390ASP comprises a video circuit, a chroma circuit, a sync circuit, a vertical circuit and a horizontal circuit as shown in Figure 7.

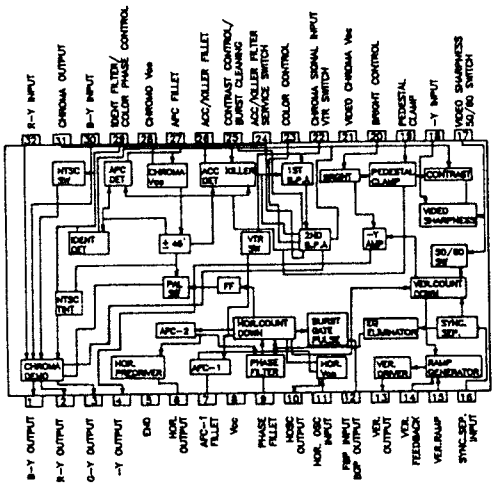


Figure 7. Internal Block Diagram of M51390ASP

1. VIDEO CIRCUIT

(2) Video Input

The internal block diagram only for the video is shown is Figure 8.

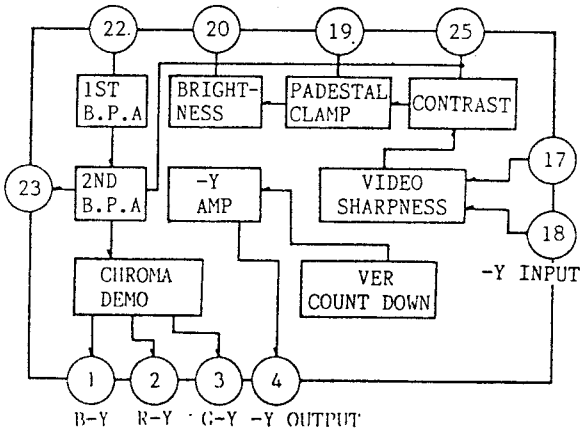


Figure 8. Internal Block Diagram of Video Part of M51390ASP

The video signal is fed to pin 18 of IC301 M51390ASP and is amplified by the internal contrast amplifier. The gain of the amplifier is 11dB in case 2.4Vp-p is required for-Y output, the level of the input signal is 2.4Vp-p/11dB (3.55)=670mVp-p.

(3) Contrast

Pin 25 is provided for the contrast control. A resistor is inserted between the contrast VR and the ground for the matching between the knob angle and the control range.

(4) Video Sharpness

The peak of the video tone is controlled by the DC boltage which is applied to pin 17.
Due to the VIF characteristic and the delay line the phase deviation of -Y output may occur.
The inputted video signal is invered by the differential circuit at pin 17 and the internal circuit of IC. The inverted signal is added by the video signal which is applied to pin 18, so that the video sharpness control can be performed.

(5) Current Limiter

The beam current limiter controls the maximum power dissipation of the receiver and protects the tube from developing purity errors associated with mask distortion due to excessive heating.
The fly back transformer voltage is sensed across C411 and is fed via the beam current network to the contrast control and the brightness control.
As the beam current increases, the voltage across C411 is decreased and hence the contrast and brightness control voltages via R421.

(6) Brightness

Pin 20 is provided for the brightness control. The relation between the input of the brightness control and the output of-Y is linear so that 1V increment of the input makes 1V increment of the output of-Y.
The feature of ABL is performed by the control of the voltage at pin 20. When the voltage is decreased, the brightness reduces.
The ABL circuit is shown in Figure 9.

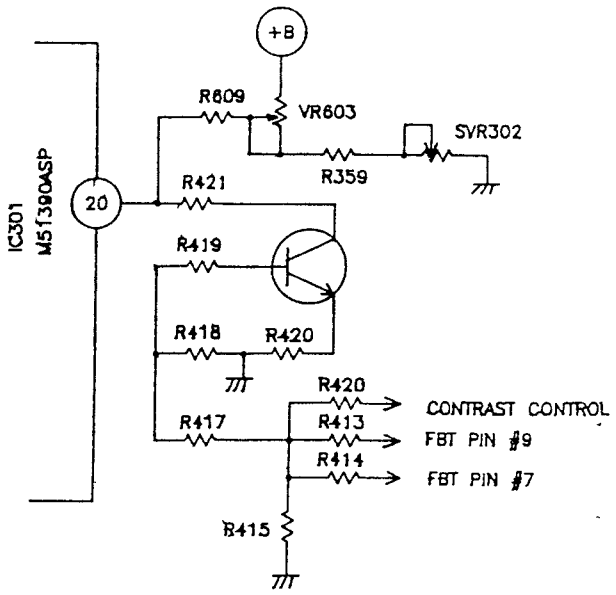


Figure 9. ABL Circuit

(7) Luminance Output

Pin 4 provides the output of-Y.
Since the horizontal flyback pulse is fed to pin 4 the internal AND gate provides the blanking signal for the luminance signal. The sensing level of the flyback pulse internally set to 10.3V and the excessive pulse from the flyback transformer is to be absorbed by the circuit in the IC.

2 DEFLECTION CIRCUIT

(1) Sync Separation

The output of the video detection is fed via the sound trap L207-CF205 to IC202, IC202 is an emitter follower so that better frequency characteristic and low distortion can to performed.
R328 is for current limiting.
R329 and C336 are for the time constant, and are selected for the required DC voltage of sync tip and the peak voltage.
C335 is the high frequency filter especially for the weak signal reception.
The defiection block in M51390ASP is shown in Figure.

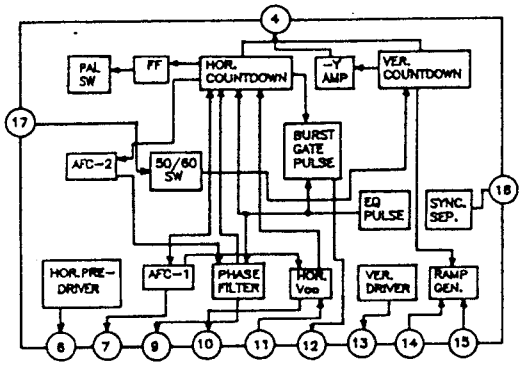


Figure 10.
Block Diagram of Sync of M51390ASP

(2) Burst-Gate Pulse

The output of the Burst-Gate Pulse is fed to pin 12 of IC301 M51390ASP.
The output of the BGP connect pin 30 of IC1 M52026SP that is the SECAM Board.
The voltage of the BGP is 8.5(Vp-p).
The voltage of the BGP includes the voltage of the Fly Back Pulse as shown in Figure 11.

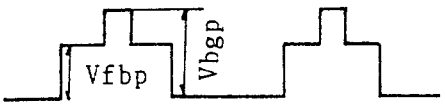


Figure 11.

(3) Vertical Oscillation

Count-down method is applied to the vertical oscillator in M51390ASP.

(4) Vertical Driver

The vertical driver in M51390ASP generates the sawtooth wave. Pin 14 is provided for the feedback of AC and DC. The sawtooth wave is generated by charging and discharging of C338 in accordance with the on-off function of the internal transistor.

(5) AFC and Horizontal Oscillation

The reference sawtooth wave which is integrated from the Flyback pulse is fed to pin 7.
The phase detector inside of IC compares the phases of the sawtooth wave and the sync signal so that the difference can be fedback to the horizontal oscillator for the constant frequency.
The ceramic resonator RS301 is provided at pin 11 for the horizontal oscillation.

(6) Horizontal Driver

The output of horizontal pre-driver at pin 6 is fed to the base of Q401, then the horizontal driver stage starts to work.

(8) Vertical Output

The output of the vertical driver inside of IC301 is amplified by the internal amplifiers of IC401
The Fly Back generator circuit which can reduce the power consumption is applied to the vertical output stage.

(9) Horizontal Output

The pulse signal from the horizontal oscillator is fed to the base of Q401 .
Q401 is for AC coupling.
The loads of Q402 are the flyback transformer, the deflection coils.
C408 are charged when Q402 conducts and are used as an energy source during the second half of the flyback interval.
Q402 conducts for the right side of the picture while the damper diode in the internal of transistor conducts for the left side of the picture, so that the complete horizontal scanning can be performed.

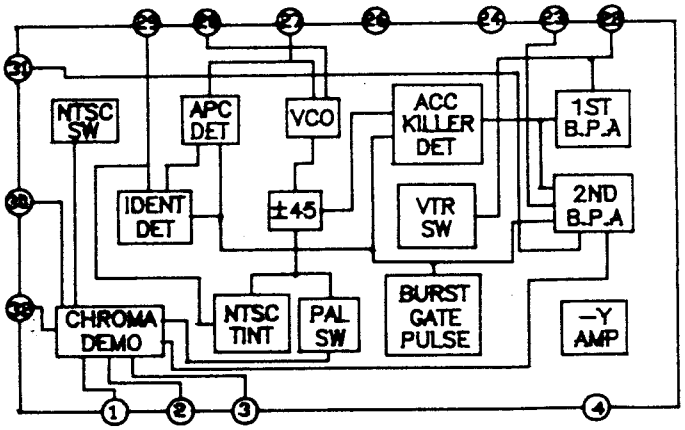


Figure 12.
INTERNAL BLOCK DIAGRAM OFCHROMA PART OF M51390ASP

3. CHROMA CIRCUIT

(1) Bandpass Amplifier

The chroma signal is fed via the chroma bandpass filter C326 and L301 to Pin 22.
C316 is to block DC contents.

(2) APC

The trimmer capacitor previously used in series with the crystal is not necessary, so that the APC alignments is not required. The pull-in range of APC is ± 300Hz minimum. Voltage controlled oscillator is applied to the APC as shown in Figure 13.

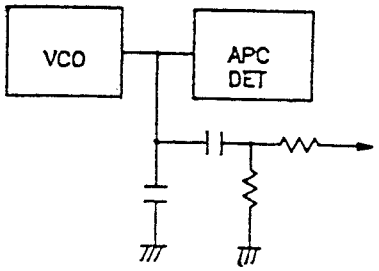


Figure 13.
BLOCK DIAGRAM OF APC CIRCUIT

(3) ACC

Pin 26 is provided for the ACC filter and C310 is connected to the ground in order to eliminate the ripple.

(4) Color Killer

C312 and R312 at pin 24 are provided as a filter of the color killer circuit.
in case of B/W TV broadcasting or weak signal reception, the killer circuit decreases the gain of chroma amplifier to zero, so that the picture is forced to be only black and white.

(5) Color Difference Signal

The demodulated color difference signals R-Y, G-Y and B-Y are provided at pins 2,3 and 1.
The level of the output is 6.5Vp-p nominal.
As a sub-carrier filter for each color difference signal, low pass filters are provided between IC301and the video output transistors. R355 and C344 for R-Y, R356 and C343 for G-Y, R354 and C345 for B-Y. These filters can also be quite effective for the flashover protection.

(6) Video Output

The outputs of color difference signal R-Y, G-Y and B-Y are fed via the low pass filters to the bases of the respective output transistors.
Since-Y signal is applied to the emitters of the respective output transistors, Y signals are offset, and the-R, -G and -B signals are fed to the respective cathodes of the CRT. The drive control VRs are trimmed for correct white balance tracking in the highlights and the bias control VRs perform a similar function in the lowlights.
R713, 712 and R711 are for the flashover protection of the respective guns.

KA2131

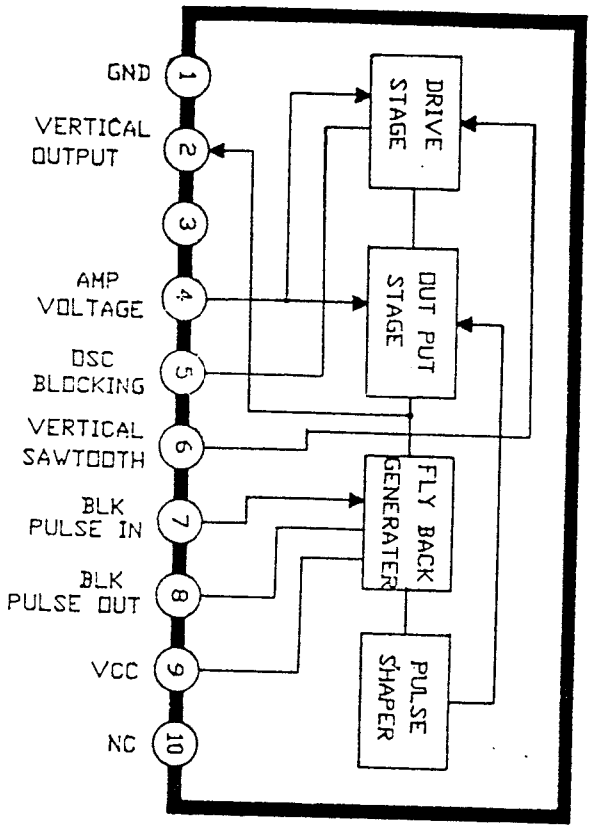


Figure 14. Internal Block Diagram of KA2131

HIGH VOLTAGE CHECK

CAUTION : There is no HIGH VOLTAGE ADJUSTMENT on this chassis. The 11.0+ 0.2 DC volt power supply must be properly adjusted to insure the correct high voltage.

1. Connect an accurate high voltage meter to the anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 17K volts.
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 19K volts under any conditions.

GENERAL ALIGNMENT INSTRUCTIONS

THIS RECEIVER IS TRANSISTORIZED AND SPECIAL CARE MUST BE TAKEN WHEN SERVICING. READ THE FOLLOWING NOTES BEFORE ATTEMPTING ALIGNMENT.

1. Alignment requires an exacting procedure and should be undertaken only when necessary.
2. The test equipment specified or its equivalent is required to perform the alignment properly. Use of equipment which does not meet these requirements may result in improper alignment.
3. Correct matching of the equipment is essential. Failure to use proper matching could result in responses which may result in improper operation of the receiver.
4. Use of excessive signal from a sweep generator can cause overloading of receiver circuit. Overloading should be avoided to obtain a true response curve. Insertion of markers from the marker generator should not cause distortion of the response.
5. The receiver should be connected to an DC power source with voltage and frequency as specified in the nameplate of the backcover.
6. Do not attempt ot connect or disconnect any wire while the receiver is in operation. Make sure the power cord is disconnected, before replacing any parts in the receiver.
7. An isolation transformer must be used to prevent shock hazard.

INSTALLATION AND SERVICE ADJUSTMENT

GENERAL

In the majority of cases, a color television receiver will need only slight touch-up adjustment upon installation. Check the basic characteristics such as height, vertical sync., horizontal sync. and focus. Observe the picture for good black and white details without objectionable color shading. If color shading is evident, demagnetize the receiver. If color shading still persists, perform purity and convergence adjustments. This should be all that is necessary to achieve optimum receiver performance.

THE METHOD OF ADJUSTMENTS

* B+ VOLTAGE ADJUSTMENT

(1) Minimum to the BRIGHTNESS VOLUME and the voltage of TP501 POINT adjust the B+ VOLTAGE ADJUSTMENT SVR501 to 11+ 0.2(V).

(2) Then the SUB-BRIGHTNESS VOLUME adjust minimum.

(3) The input voltage impress the DC voltage 13.5(V).

* SCREEN VOLUME ADJUSTMENT

(1) Fix the video output DEIVER VOLUME SVR701,702 and the video output DIAS VOLUME SVR703,704,705 to the VOLUME center.

(2) Adjust the BRIGHTNESS and the CONTRAST VOLUME to maximum.

(3) Change the SERVICE SWITCH SW301 to the SERVICE position.

(4) Becoming the CROSSWAYS A LINE, adjust the SCREEN VOLUME.

* WHITE BALANCE ADJUSTMENT

(1) Fix the SERVICE SWITCH to the SERVICE position.

(2) The CROSSWAYS A LINE adjust the BIAS VOLUME SVR703,704,705 to the White.

(3) Fix the SERVICE SWITCH to the NORMAL position.

(4) Attach the LUMINANCE METER to the center position.

(5) Adjust the BRIGHTNESS and the CONTRAST to maximum.

(6) The LED of the LUMINANCE METER adjust the video output DRIVER VOLUME to the green color.

(7) Adjust the BRIGHTNESS and the CONTRAST to minimum.

(8) The LED of the LUMINANCE METER adjust the wideo output BIAS VOLUME to the green color.

(9) Adjust again to a (5),(6),(7),(8) clauses.

* FOCUS VOLUME ADJUSTMENT

(1) Receive the LION PATTERN.

(2) The picture adjust the BRIGHTNESS and the COUNTRAST VOLUME to the clearness.

* ABL ADJUSTMENT
(Automatic Brightness Control Limit)

(1) Receive the CROSS HATCH PATTERN.

(2) Adjust the BRIGHTNESS and the CONTRAST VOLUME to maximum.

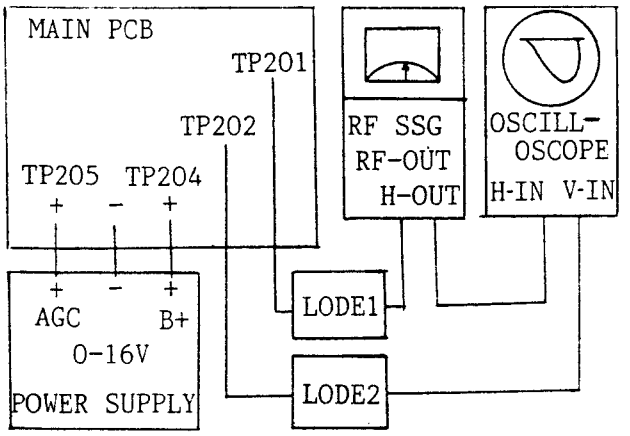
(3) Connect TP1,2 POINT With the DC VOLTMETER.

(4) The voltage of TP1,2 POINT adjust the SUB-BRIGHTNESS VOLUME to 0.25+0.01(V).

* VIF DET. COIL ADJUSTMENT

(1) Set the VIF ADJUSTMENT MEASUREMENT UNIT from the left (31.9MHz, 33.4MHz, 34.47MHz, 37MHz, 38.9MHz)

(2) The MEASUREMENT UNIT connect as shown in Figure 16.



SYSTEM	FREQUENCE					
NT	39.75	41.25	42.17	44	45.75	47.25
B/G(D.K)	31.9	33.4	34.47	37	38.9	40.4

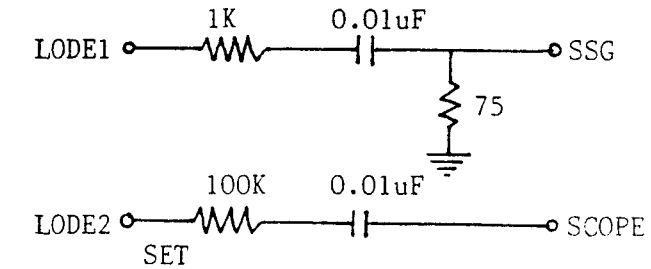


Figure 16. The Method of the Measurement Unit Connection.

(3) 38.9MHz MARKER POINT adjust the DETECTOR COIL (T203) to maximum.

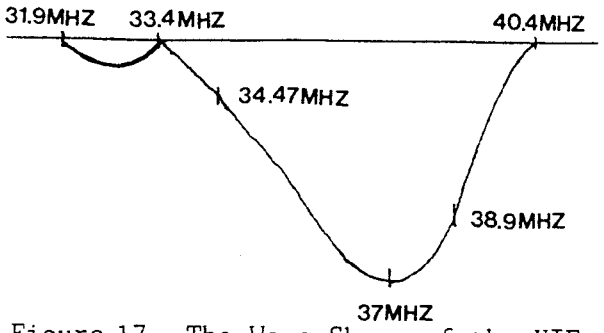


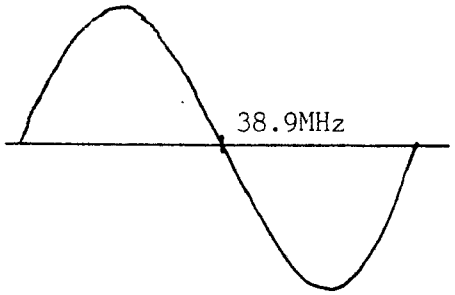
Figure 17. The Wave Shape of the VIF Adjustment.

* AFT DETECTOR COIL ADJUSTMENT

(1) Identify the frequence of SSG as the frequence of the VIF Adjustment.

(2) The Method of the Measurement Unit Connection identifg the Method of VIF Adjustment, but only connect TP203 With the Verical input of Oscilloscope.

(3) 38.9MHz MARKER POINT adjust the DETECTOR COIL (T204) to the center.



SYSTEM	FREQ
NT	45.75MHZ
B/G	38.9MHZ

Figure 18. The Wave Shape of AFT.

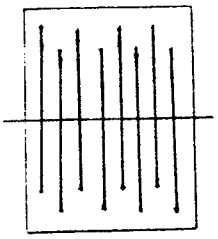
* COLOR BURST CLINE ADJUSTMENT

(1) Receive the Color signel.

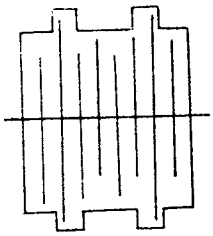
(2) The signal of TP301 adjust the BURST COIL (T301) to minimum.

(3) The Wave Shape refer to FIGURE 19. (Especilly, use to the Scope)

1



2



1. The Wave Shape before adjustment.
2. The Wave Shape after adjustment.

Figure 19. The Wave Shape of the Color Burst.

* AGC ADJUSTMENT

(1) Receive the UHF Channel 14. (Then, the input level of the RF must to be 90dB-100dB)

(2) The UHF Channel 14 adjust the AGC VR (SVR201) to be disappear the Noise.

(3) The input level 100dB check to be saturated by the VHF Channel reception.

* COLOR PHASE ADJUSTMENT

(1) Following by system, receive the Color DEMODULATOR signal.

(2) The Color phase adjustment adjust after the Color Burst Cline adjustment.

(3) Adjust to be piled maximum upon the phase Volume as shown in FIGURE 20.

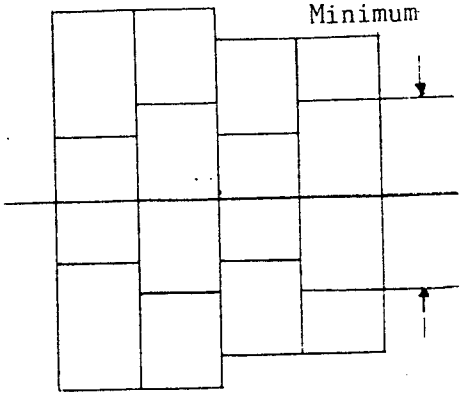


Figure 20. The Demodulator Wave Shape of TP302

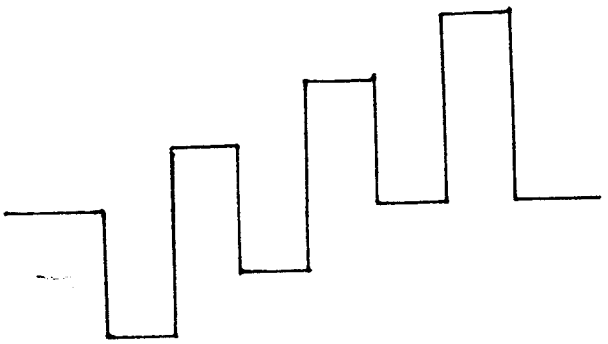


Figure 21. The Color Bar Wave Snape of TP301

(4) When the PHASE VOLUME don't adjust, adjust to be piled the PHASE COIL (T301) upon as a (2) Clause.

(5) Receive to the Color Bar and the Wave Shape of TP301 check to be same as shown in Figure 21.

* V-HEIGHT ADJUSTMENT

(1) Receive the LION PATTERN.

(When the LION PATTERN don't exist, use to the PATTERN with correspondence)

(2) Adjust the V-HEIGHT VR (SVR401) to be identified with the OVER SCAN of the Horizontal Amplitude.

CRT GRAY SCALE ADJUSTMENT

1. Set the COLOR Control to minimum.
2. Adjust the BRIGHTNESS and CONTRAST Controls to obtain low light area.
3. Adjust RED, GREEN and BLUE BIAS Controls, (705, 703, 702) to obtain gray raster of low brightness.
4. Adjust the BRIGHTNESS and CONTRAST Controls to maximum.
5. Adjust the BLUE DRIVE. (VR701) and RED DRIVE Controls (VR704) to obtain proper white-balanced picture in high light areas.
6. Repeat steps 2 through 5 for correct gray scale.

COLOR PURITY ADJUSTMENT

1. Operate the receiver for 20 minute to warm up the CRT with Bright control maximum.
2. Degauss the receiver fully by using an external degaussing coil.
3. Roughly adjust convergence.
4. Receive a black and white signal.
5. Turn red and Low Light controls (VR705, VR702) fully counterclockwise to obtain a green field. Adjust Drive controls when green field is not obtained.
6. Loosen the deflection yoke clamp screw and move the deflection yoke as close to the purity magnet as pssible.
7. Loosen purity, magnet clamp and adjust the purity magnet to set the vertical green raster precisely at the center of the scree. The tighten the clamp.
8. Slowly move the deflection yoke forward and ajust for best overall green screen.
9. Tighten the deflection yoke clamp screw.
10. Produce the blue and red raster by Low Light controls and observe that good purity is obtained on the respective field.

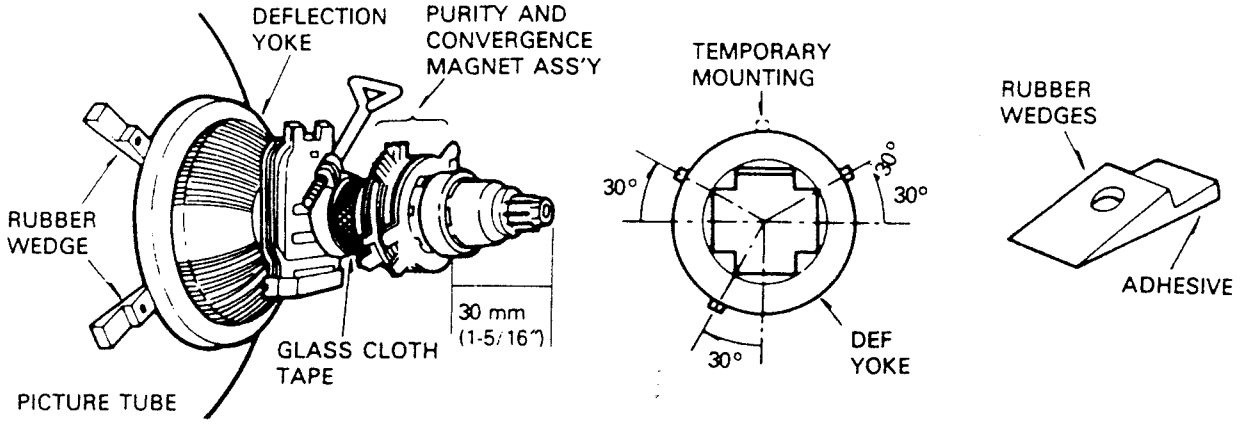


Figure 16. Tube Assembly

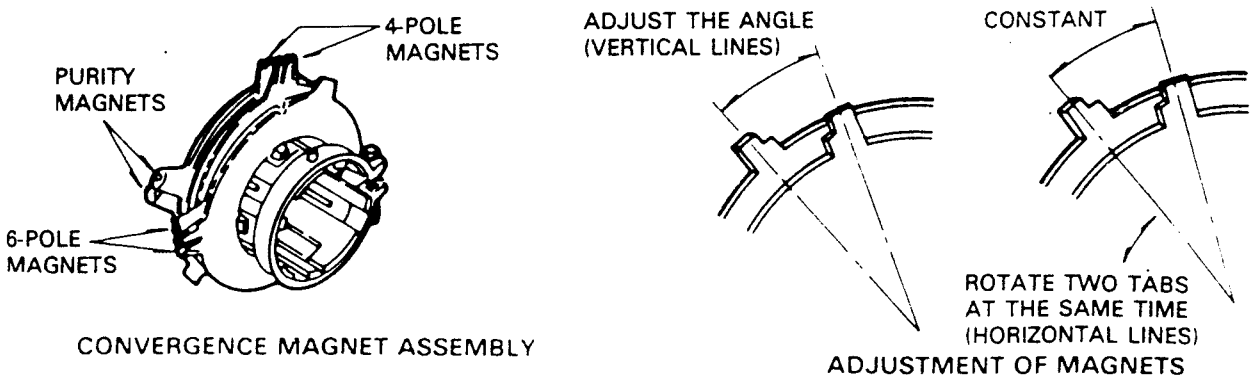


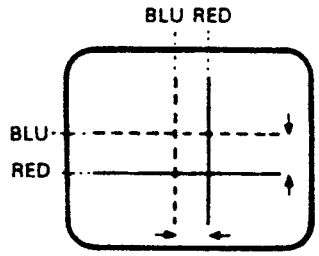
Figure 24. Purity and Convergence Magnets

CONVERGENCE ADJUSTMENTS

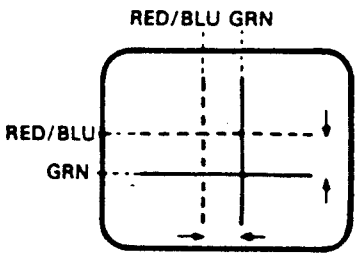
NOTE : Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

CENTER CONVERGENCE ADJUSTMENTS

1.Receive crosshatch pattern with a color bar signal generator.
2.Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3.Adjust the two tabs of the 4-Pole Magnets to change the angle between them and superimpose red and blue vertical lines in the center area of the picture screen.
4.Turn both tabs at the same time without changing position between them, to superimpose red and blue horizontal lines at the center of the screen.
5.Adjust two tabs of 6-Pole Magnets to superimpose red/blue line with green. Adjusting the angle affects the horizontal lines.
6.Repeat adjustments 3, 4, 5, observing red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets interact.



4-POLE MAGNETS MOVEMENT

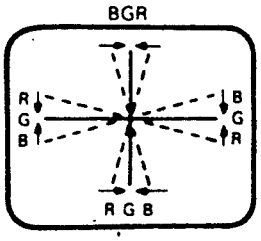


6-POLE MAGNETS MOVEMENT

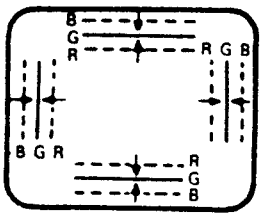
Figure 25. Center Convergence Adjustment

CIRCUMFERENCE CONVERGENCE ADJUSTMENT

1.Loosen the clamp screw of deflection yoke to allow the yoke to tilt.
2.Place a wedge temporarily. (Temporary Mounting). (do not remove cover paper on adhesive part of a new wedge).
3.Tilt front of the deflection yoke up or down to obtain better convergence in circumference. Push the mounted wedge into the space between picture tube and the yoke to hold the yoke temporarily in place.
4.Place other wedge at bottom and remove the cover paper to stick.
5.Tilt front of the yoke right or left to obtain better convergence in circumference.
6.Keep the yoke positioned and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to secure the yoke.
7.Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to secure the yoke.
8.After inserting three wedges, recheck overall convergence. Tighten the screw firmly to hold the yoke tightly in place.
9.Place 3 adhesive tapes over wedges, as shown in Figure 16.



INCLINE THE YOKE UP (OR DOWN)

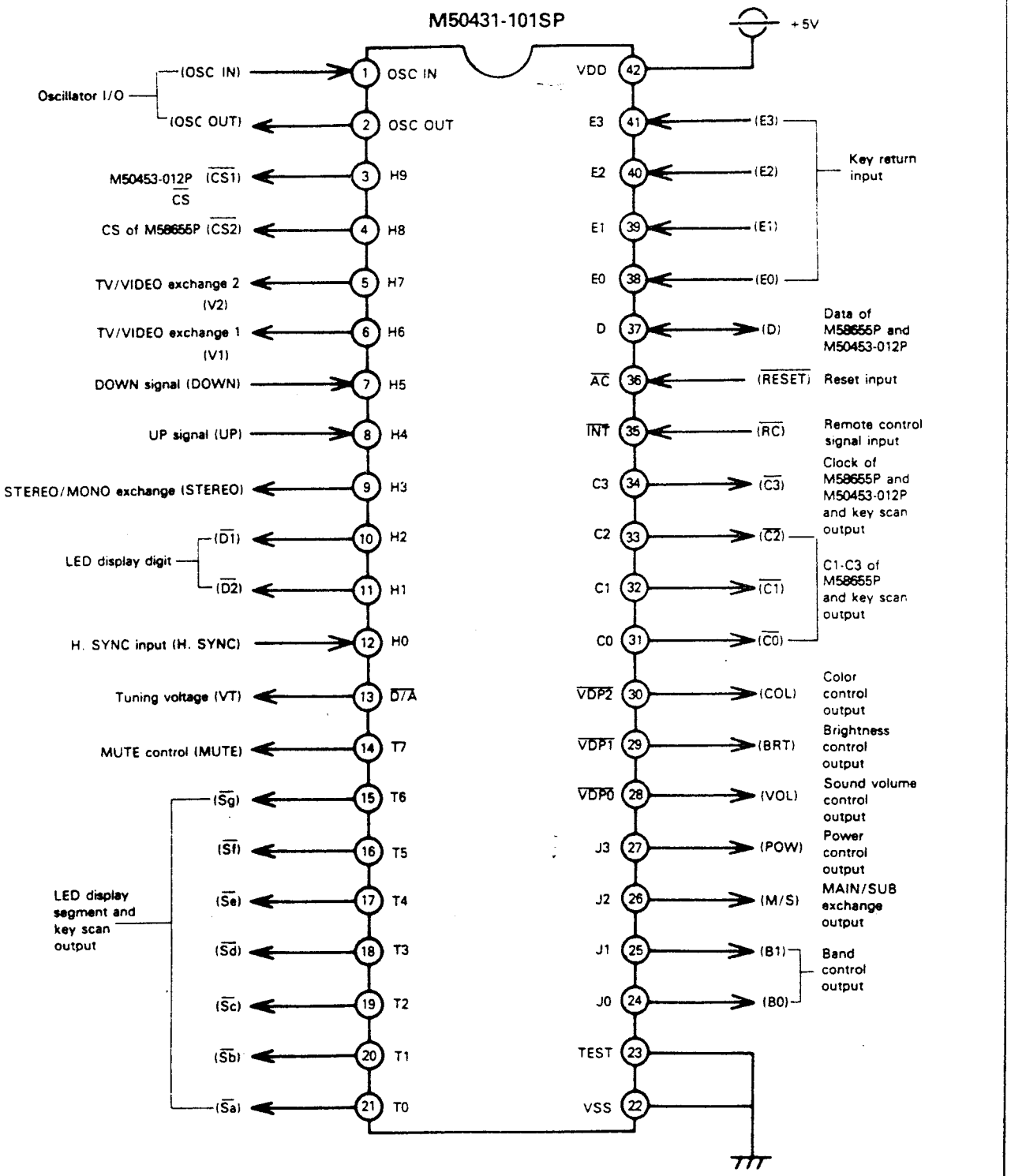


INCLINE THE YOKE RIGHT (OR LEFT)

Figure 26. Circumference Convergence Adjustment

(1) Terminal Connection Diagram

3. M50431-XXX SP



(2) Terminal Description

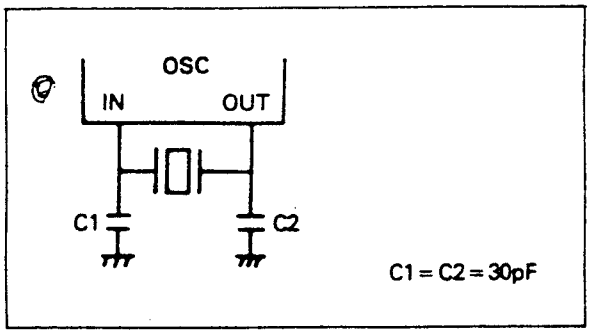
<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Name</th><th>Function Explanation</th></tr>
<tr><td>1, 2</td><td>OSC IN
OSC OUT</td><td>Oscillator
Input/Output</td><td>By connecting the 4 MHz ceramic oscillator and capacitors between the terminals as shown below, the reference clock can be obtained. Since the constant of capacitors and so forth depends on the oscillator in use, use the recommended values of the manufacturer.
 

Fig. 5-1 Example of oscillating circuit by using a ceramic oscillator</td></tr>
<tr><td>3</td><td>SC1</td><td>Chip Select Output of M50453-012P</td><td>This is a chip select signal output terminal for on-screen display IC M5043-012P. The signal goes low when data is transferred to the M50453-012P.</td></tr>
<tr><td>4</td><td>CS2</td><td>Chip Select Output of M58655P</td><td>This is a chip select signal output terminal for an EAROM M58655P. This signal goes low when data is transferred to the M58655P.</td></tr>
<tr><td>5, 6</td><td>V2, V1</td><td>TV/VIDEO Exchange 1, 2</td><td>V1 and V2 are output terminals for exchangeing TV/VIDEO. TV/VIDEO exchanging is controlled by input of TV/VIDEO key as shown below.
<table>
<tr><th>Mode</th><th>V1</th><th>V2</th></tr>
<tr><td>TV</td><td>L</td><td>L</td></tr>
<tr><td>VIDEO 1</td><td>H</td><td>L</td></tr>
<tr><td>VIDEO 2</td><td>L</td><td>H</td></tr>
</table>
When power is OFF, TV mode is set, and when the power is ON, start, start from TV mode.</td></tr>
<tr><td>7</td><td>DOWN</td><td>DOWN Signal Input</td><td>This is input of DOWN signal generated by comparing AFC siganl with the reference voltage, and use for auto-search and digital AFT operation. Input is in active "H".</td></tr>
<tr><td>8</td><td>UP</td><td>UP Signal Input</td><td>This is input of UP signal generated by comparing AFC signal with the reference signal, and used for auto-search and digital AFT operation. Input is in active "L".</td></tr>
<tr><td>9</td><td>STEREO</td><td>Stereo/Monaural Exchange Control Output</td><td>This is a sound exchange signal output terminal. This signal goes high after releasing reset. The signal state rolls over between high and low whenever the STEREO/MONO key is depressed.
High level ..... Stereo
Low level..... Monaural</td></tr>
<tr><td>10, 11</td><td>D1 and D2</td><td>Digit Output</td><td>These are digit signal output terminals for LED display. For the two digits display, outputs are as follows:
<table>
<tr><th></th><th>D1</th><th>D2</th></tr>
<tr><td>Upper digit ON</td><td>Low</td><td>High</td></tr>
<tr><td>Lower digit ON</td><td>High</td><td>Low</td></tr>
</table></td></tr>
</table>

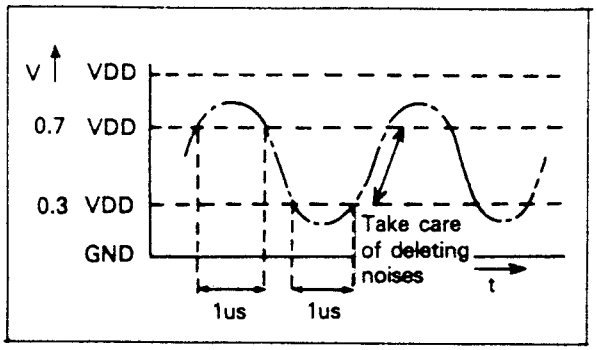
<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Name</th><th>Function Explanation</th></tr>
<tr><td>12</td><td>H. SYNC</td><td>Horizontal Synchronous Signal Input</td><td>This is an input terminal for horizontal synchronous signal. Pulses entered into H. SYNC terminal are counted for approx.
1.02 ms and when the value of the counter is in the range from 14 to 24, existence of synchronizing signal is determined. The input conditions are as follows:
 

Fig. 5-2 Input conditions of horizontal synchronous signals.

Keep the settled levels of low and high states for more than 1 us.
In addition, take care of noises around input threshold voltage.</td></tr>
<tr><td>13</td><td>VT</td><td>Tuning Voltage Control</td><td>This outputs a waveform which is modulated bys the pluse-width in accordance with 14-bit digital information.</td></tr>
<tr><td>14</td><td>MUTE</td><td>Mute Control Output</td><td>This is a sound mute control output terminal. This signal is active high. This terminal is automatically controlled when the device is powered on/off, the program is selected, TV/VIDEO is exchanged, MAIN/SUB is exchanged, STEREO/MONO is exchanged, and during auto-search operation.
Besides, if the cycle disappears during slow digital AFT, "H" is set automatically. (MUTE ON state is set.)
* When the MUTE key is depressed, this port is not changed.</td></tr>
<tr><td>24, 25</td><td>B0 and B1</td><td>Band Control Output</td><td>These are control band signal output terminals for a tuner. Assignment for bands is as follows:

Table 5-2
<table><tr><th>B0</th><th>B1</th><th>Band</th></tr><tr><td>L</td><td>L</td><td>VHF-L</td></tr><tr><td>H</td><td>L</td><td>VHF-H</td></tr><tr><td>H</td><td>H</td><td>CATV</td></tr><tr><td>L</td><td>H</td><td>UHF</td></tr></table></td></tr>
<tr><td>26</td><td>M/S</td><td>MAIN/SUB Exchange Output</td><td>This is an exchange signal output terminal of MAIN/SUB. This signal goes high when the device id powered on. This terminal is controlled by the MAIN/SUB key. Whenever the key is depressed, the signal rolls over between low and high.

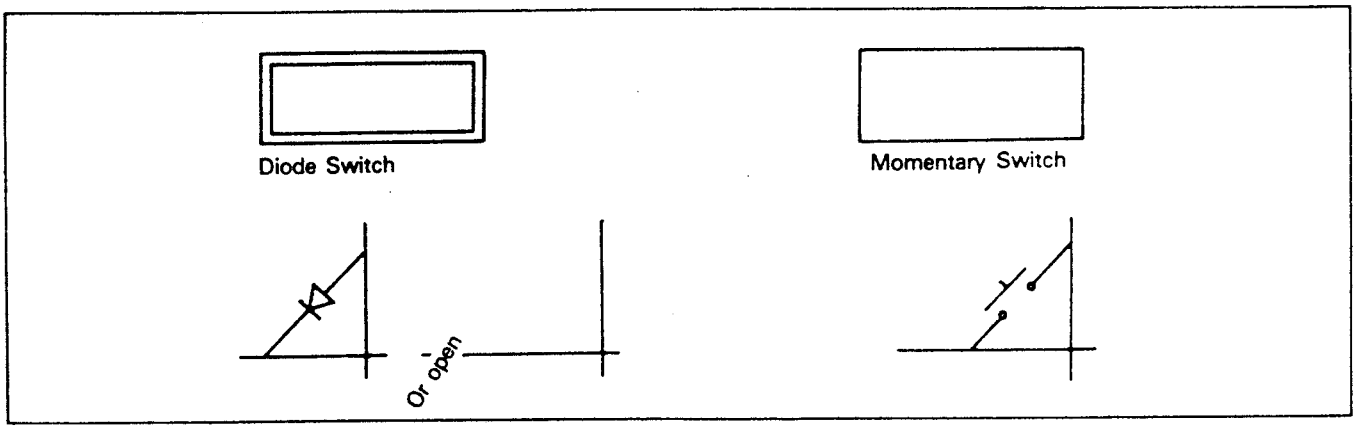
High level ..... Main
Low level..... Sub</td></tr>
</table>

Pin No.	Symbol	Name	Function Explanation
27	POW	Power Control Output	This is a power control terminal, which serves to control an external relay. This output is active high and when the reset function is operated, it reads POWER ON START key at approx. 20 ms after releasing reset. If POWER ON START key is ON, the power immediately turns ON, and if the key is OFF, the power is off until POWER ON/OFF key input. This output state rolls over between high and low whenever the POWER ON/OFF key is depressed. High level ..... Power ON Low level ..... Power OFF In addition, if the off-timer is set, when the timer setting time elapses, the signal automatically goes low.
29, 30	BRT and COL	Brightness Control Output and Color Control	These are brightness and color control terminals. These output a waveform modulated bys the pulse width with 64 levels in accordance with 6-bit latch data (active low). When it is powered on, values before the device is powered off are read out from the EAROM and output to each port.
28	VOL	Sound Volume Control Output	This is sound volume control terminal (active low). The MUTE flag provided in the M50431-101SP allows the signal to immediately go high. For other specifications and output waveform, see the section of "BRT and COL".
30 – 33	C0 – C2	C1 – C3 Output of M58655P and key scan output	These are terminals for mode control of EAROM M58655P and key return signal source output terminals for key matrix.
34	C3	Clock Output for M58655P and M50453-012P and key scan output	This is a clock output terminal for an EAROM M58655P and on-screen display IC M50453-012P. Connect this terminal to the CLK of the M58655P and CK of the M50453-012P and key return signal source output terminals for key matrix.
35	RC	Remote Control Signal Input	This is a remote control signal input terminal. A remote control signal is acknowledged by sensing its edge. When a signal applied at the RC terminal goes high, the remote control signal reception operation is executed. The remote control signal input decision circuit includes a noise reduction circuit, which serves to delete less than 64 us pulses as noises. It can prevent malfunction of the device due to noises.
36	RESET	Reset Input	By adding the circuit as shown in Fig. 5-5 to the RESET terminal, when the device is powered on, the reset function can be activated. In addition, a Schmitt circuit is provided at the RESET terminal. although the reset is released at the time RESET terminal voltage Vc exceeds the threshold voltage VTH1, once released, unless Vc drops at the threshold voltage lower than VTH2, the reset function cannot be activated again. In addition, to securely activate the power-on reset function, it is necesary to set the time Vc is larger than VTH1 is more than 1 ms after the power supply voltage VDD becomes more than 4.5V Figure 5-6 shows.
37	D	Data Input/Output of M58655P and M50543-012P	This is an input/output terminal for EAROM M58655P or output terminal for on-screen display IC M50453-012P. Connects this terminal to the I/O of the M58655P and to the A_0 of the M50453-012P.
38 – 41	E0 – E3	Key Return Input	This is a key return signal input for the key matrix.
42	VDD	Power Supply Terminal	Connect this terminal to the 5V power supply.

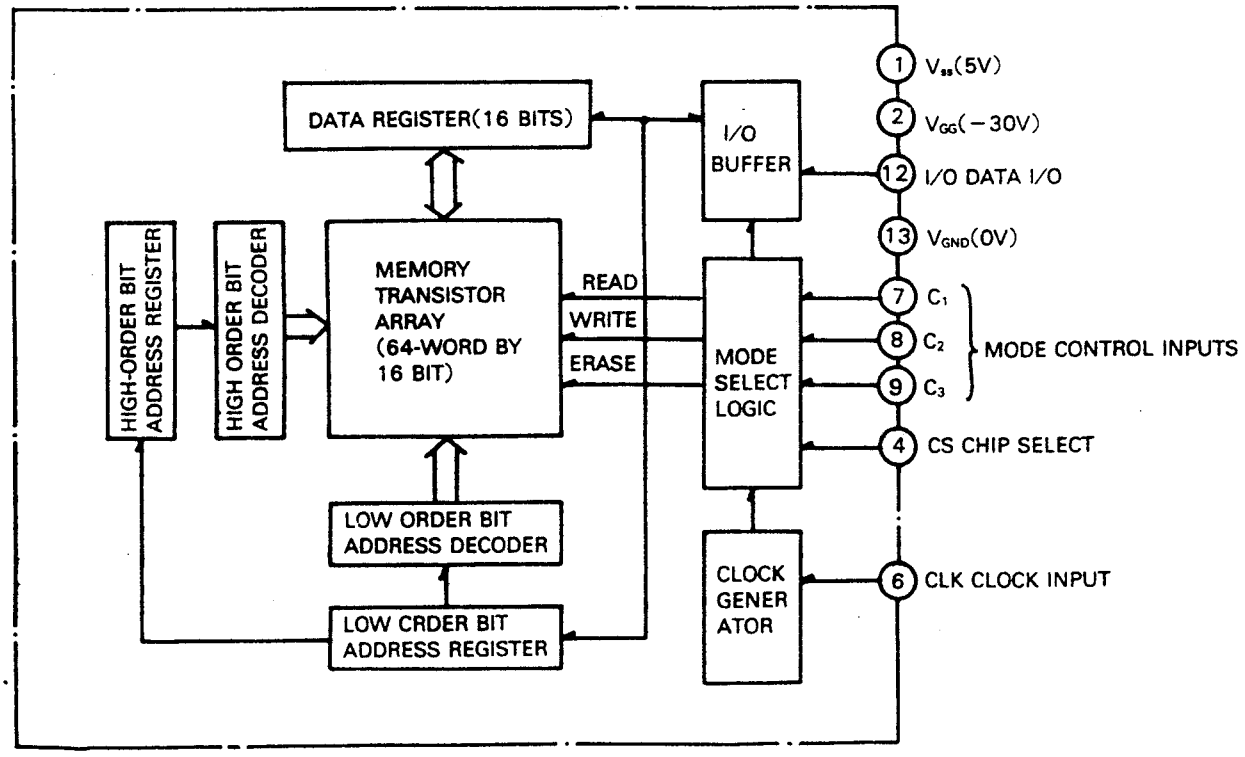
(3) Structure of Key Matrix

Input / Output	E0(38)	E1(39)	E2(40)	E3(41)
Sa(21)	PR(+)	VOL(+)	BRT(+)	COL(+)
Sb(20)	PR(−)	VOL(−)	BRT(−)	COL(−)
Sc(19)	POWER ON/OFF	TV/VIDEO	MAIN/SUB	STEREO/MONO
Sd(18)	FT(+)	FT(−)	MUTE	PR CALL
Se(17)	AS(+)	AS(−)	AFT ON	
Sf(16)	30 PR	12 PR	8 PR	
Sg(15)	1 BAND	4 BANDS	1 VIDEO/2 VIDEO	POWER ON START
C0(31)	PR 1	PR 2	PR 3	PR 4
C1(32)	PR 5	PR 6	PR 7	PR 8
C2(33)	PR 9	PR 10/PR 0	PR 11/PR 1*	PR 12/PR 2*
C3(34)	PR 13	PR 14	PR 15	PR 16

( )Terminal numbers are represented in parentheses.



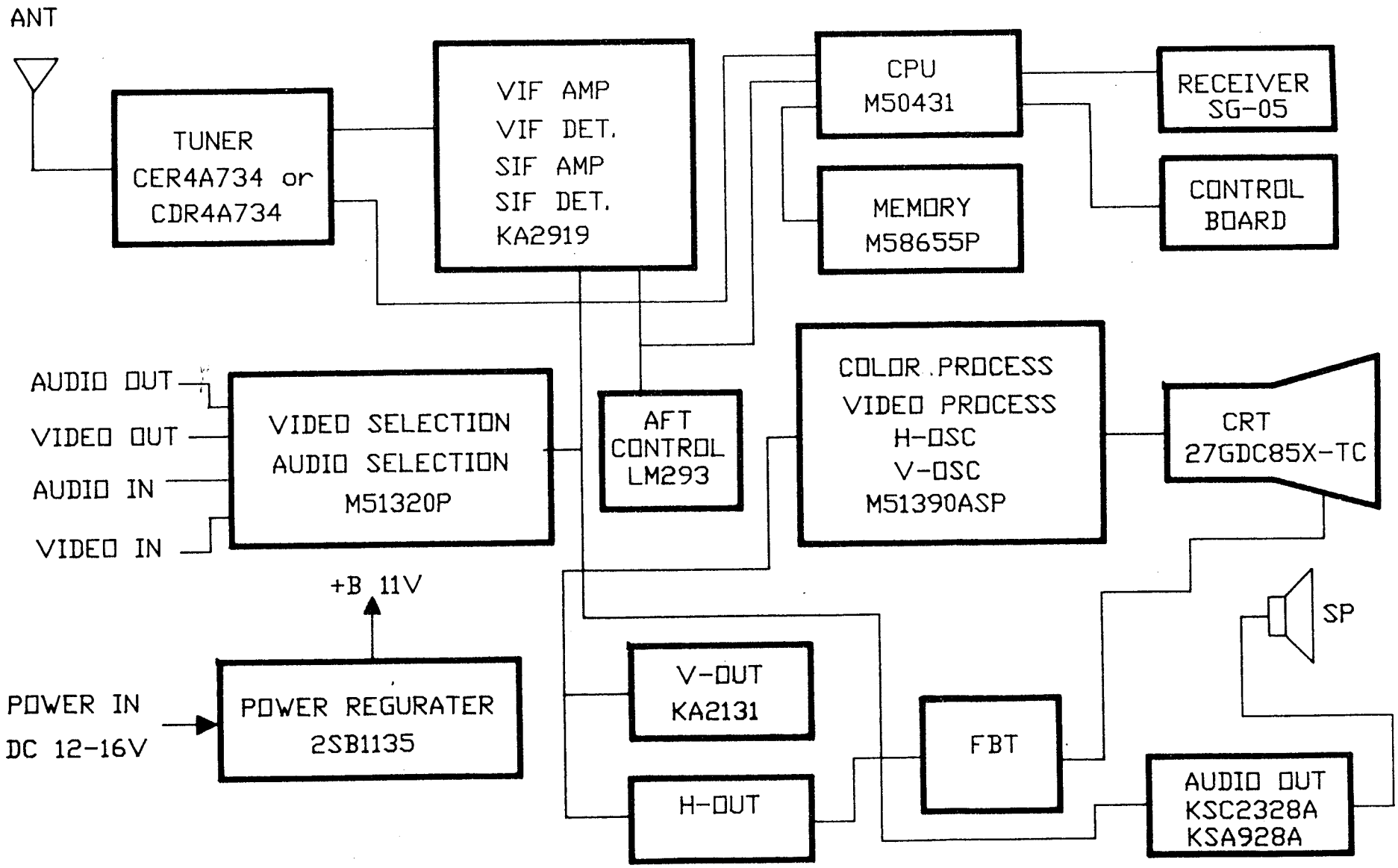
(M58655P)Terminal Connection Diagram



IC VOLTAGE CHART

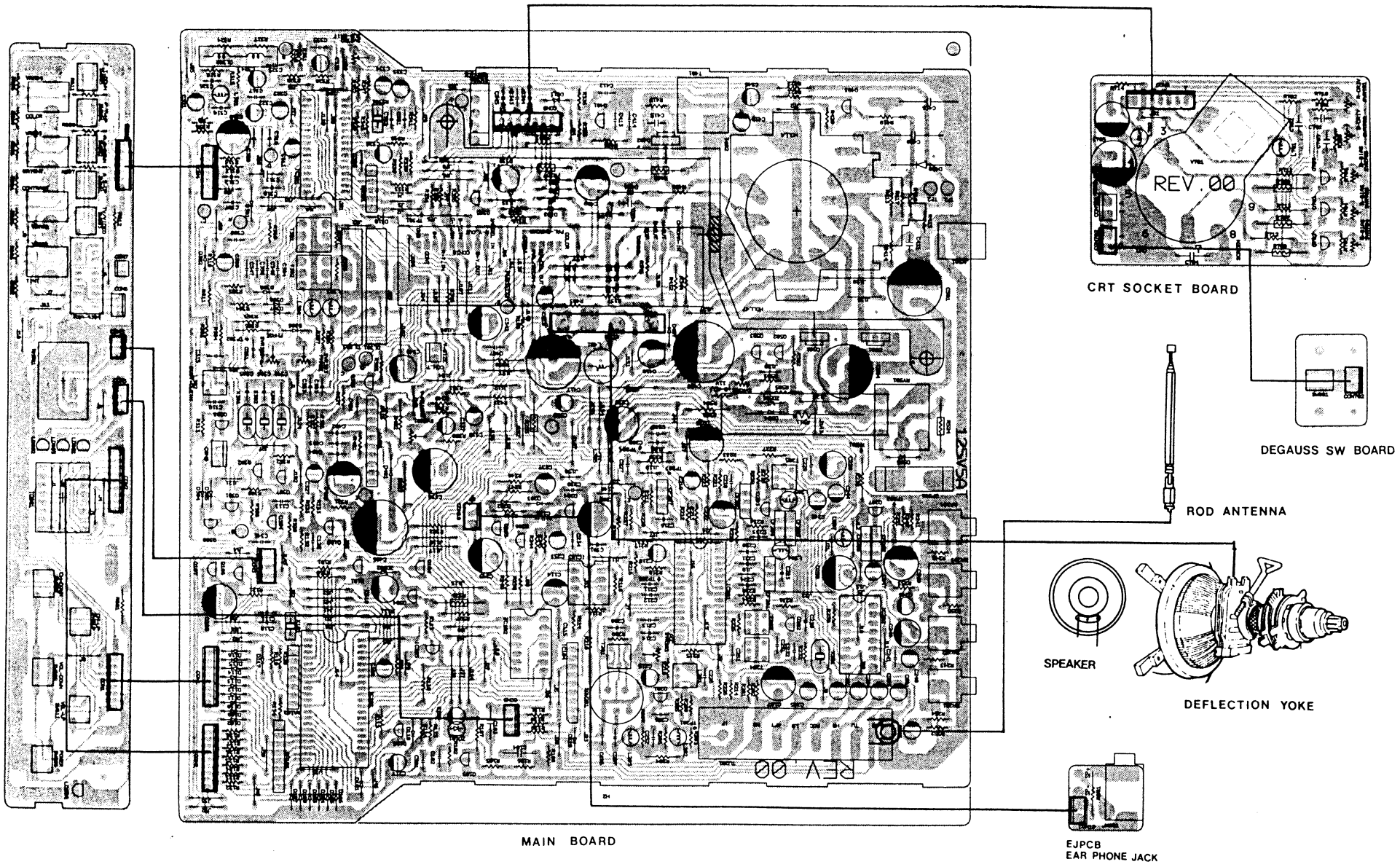
LOCATION	IT TYPE	VOLTAGE (V) . PIN NO															
IC101	M50431	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		2.2	2.3	5.1	5.1	-	0	0	5.1	-	3.4	3.4	4.6	3.6	0	5.1	3.1
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
		2.0	2.0	-	-	2.0	0	0	-	4.4	-	4.9	0.3	-	-	-	-
		33	34	35	36	37	38	39	40	41	42						
		-	-	5.1	5.1	5.1	3.3	5.1	5.1	5.1	5.1						
IC301	M51390ASP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		6.1	6.1	6.1	4.6	0	1.4	4.7	8.2	7.7	6.2	3.5	0.6	0.7	5.3	5.4	6.7
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
		8.6	1.1	2.0	5.4	10.3	2.5	-	6.7	5.0	6.9	8.5	7.3	6.9	3.1	6.5	3.1
IC201	KA2919	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		4.5	6.3	2.7	4.1	4.9	-	3.9	4.2	4.2	4.2	4.2	1.3	5.3	3.9	3.5	3.5
		17	18	19	20	21	22	23	24	25	26	27	28	29	30		
		4.6	3.2	7.1	7.1	3.2	3.7	9.9	8.9	9.3	2.7	2.7	2.7	3.2	5.5		
IC202	M51320P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		1.8	7.1	2.6	7.1	2.6	3.7	0	1.8	2.6	2.6	3.3	3.0	7.1	2.6	2.6	2.6
IC102	M58655P	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
		5.1	-27	-	5.1	-	-	-	-	-	-	-	5.1	0	3.5		
IC104	LA7910	1	2	3	4	5	6	7	8	9							
		0.6	-	-	4.5	-	10.8	9.3	-	10.8							
IC401.	KA2131	1	2	3	4	5	6	7	8	9	10						
		0	11.7	-	23.4	-	0.7	0	1.5	22.8	0						
IC103	LM293	1	2	3	4	5	6	7	8								
		-	4.9	3.1	-	6.2	4.9	5.1	10.8								
IC105	KIA7031	1	2	3													
		5.1	0	5.1													

BLOCK DIAGRAM

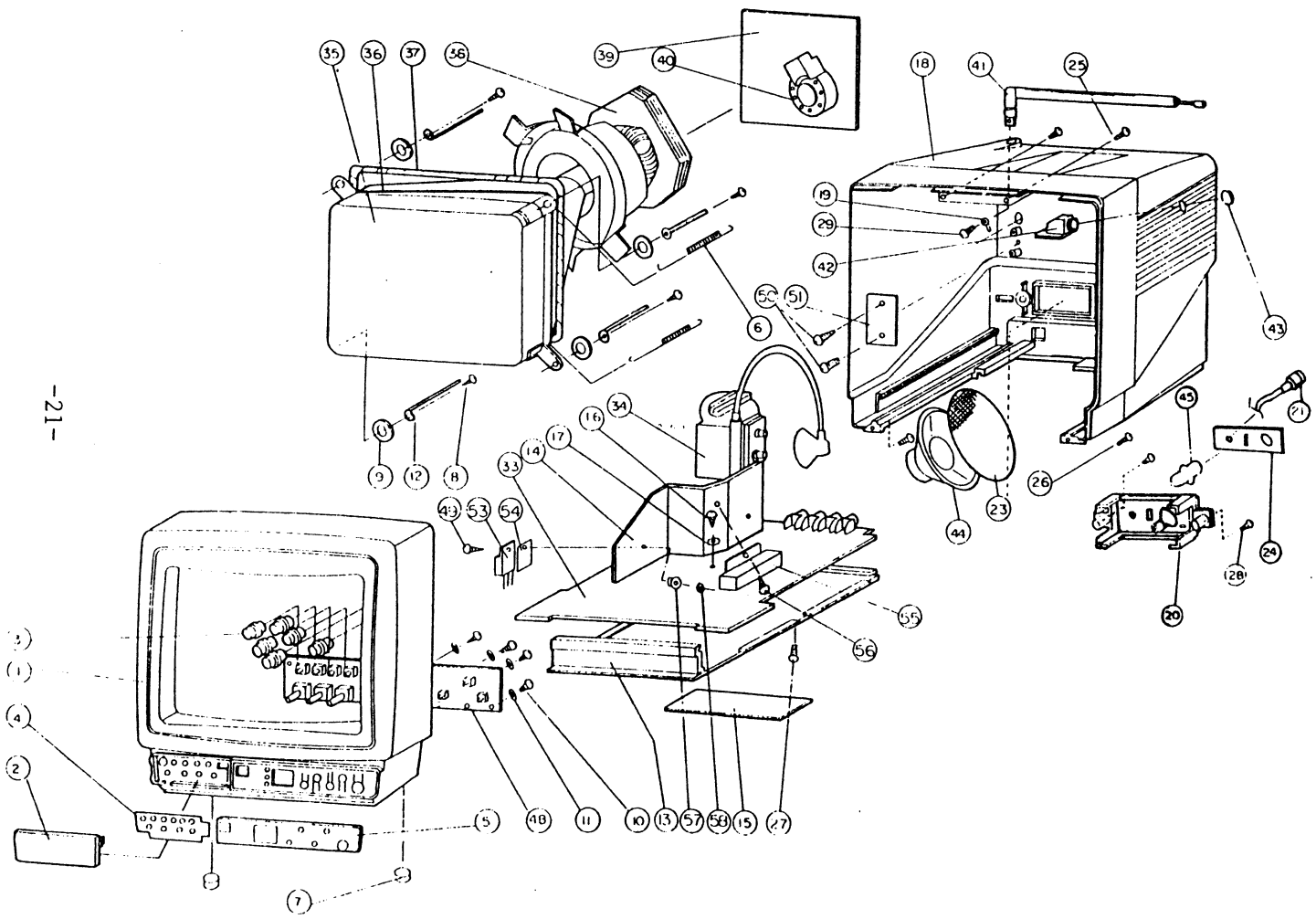


PAL

WIRING DIAGRAM



EXPLODED VIEW



No	DESCRIPTION	SPECIFICATION	QTY
01	CABINET-FRONT	ABS HB	1
02	DOOR	ABS HB	1
03	PUSH-KNOB	ABS HB	6
04	CONTROL PLATE	SUN-LOID t0.5 BLK	1
05	FRONT-PANEL	SUN-LOID t1.0	1
06	GROUND SPRING	SWP φ0.4 BLK	1
07	FOOT	RUBBER φ12×5	1
08	SCREW-TAPPING	TRUSS 4×15 YEL	4
09	WASHER	SBHG 4×20×1.0t	4
10	SCREW-TAPPING	B/H 3×10 YEL	6
11	FIBER-WASHER	FIBER φ3.2×φ8×t0.5	6
12	WIRE-CLAMP	φ4.2×55	4
13	BOTTOM-CABINET	ABS	1
14	HEAT-SINK	AL t2.0	1
15	SPEC-PLATE		1
16	SCREW-TAPPING	B/H 3×10 YEL	1
17	WASHER	FIBER φ3.2×10	1
18	CABINET-BACK	ABS HB	1
19	LUG-ANT	SBC t0.5	1
20	ANT-PACK	ABS HB	1
21	ROD-ANT PLUG		1
22			
23	SPEAKER-NET	FELT BLK	1
24	ANT- PLATE		1
25	SCREW-MACHINE	B/H 4×12 BLK	2
26	SCREW-TAPPING	B/H 3×15 BLK	2
27	SCREW-TAPPING	F/H 3×10 BLK	1
28	SCREW-TAPPING	B/H 4×10 BLK	2
29	SCREW-TAPPING	B/H 3×12 YEL	1
30			
31			
32			
33	MAIN P.C.B		
34	F.B.T		
35	C.R.T		
36	C.R.T-GROUND-BAND		
37	DEGAUSS-COIL		
38	D.Y		
39	C.R.T-P.C.B		
40	C.R.T-SOCKET		
41	ROD-ANT		
42	EARPHONE		
43	EARPHONE-NUT		
44	SPEAKER		
45	CONNECTOR		
46			
47			
48	FRONT-P.C.B		
49	SCREW-MACHINE	BH M3×8 YEL	2
50	SCREW-TAPPING	BH 3×6 YEL	2
51	DEGAUSS-P.C.B		
52			
53	TR		
54	MICA-PLATE		
55	CEMENT-RESISTOR		
56	SCREW-TAPPING	BH 3×8 YEL	1
57	INSULATE		2
58	NUT M3		2
59			
60			

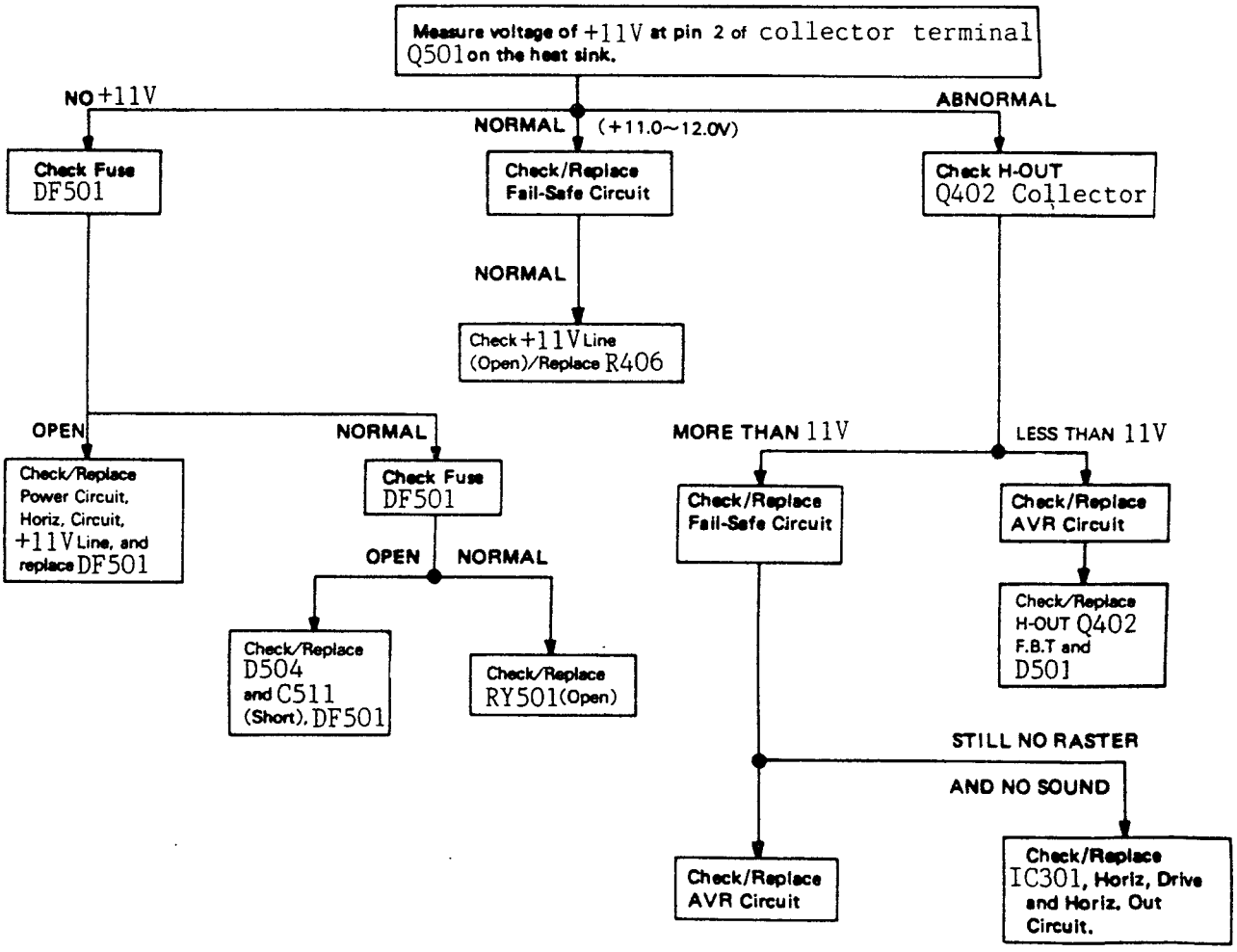
TROUBLESHOOTING CHARTS

The following charts are devoted to troubleshooting which, if followed carefully, will assist you in tracking down a fault to the correct stage.

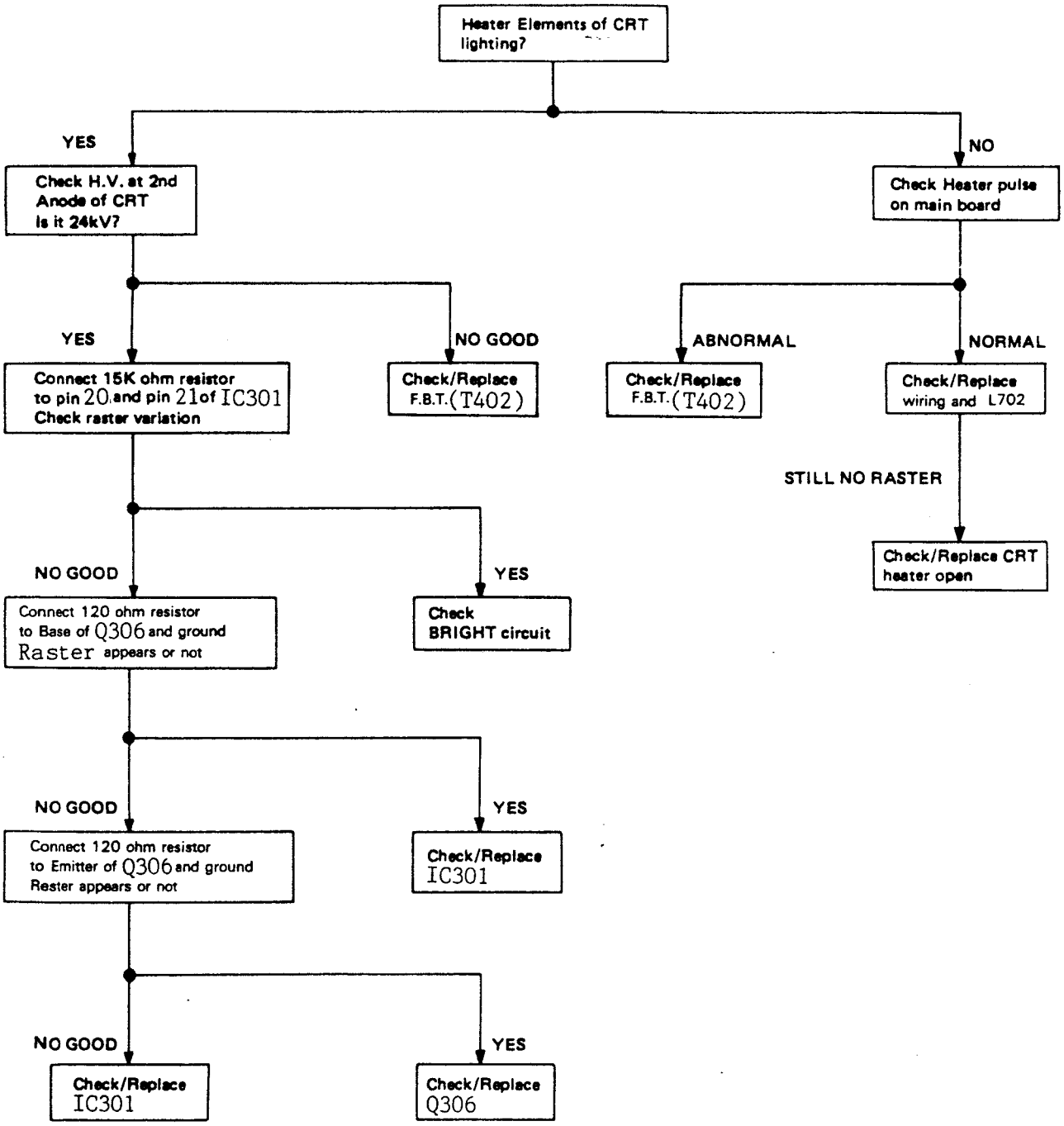
In order to utilize the charts(fault trees), first establish the complaint, i.e.—No Raster, No Sound.

Locate the chart applicable and then progress through the various alternatives until a final block indicates the offeding components or stage.

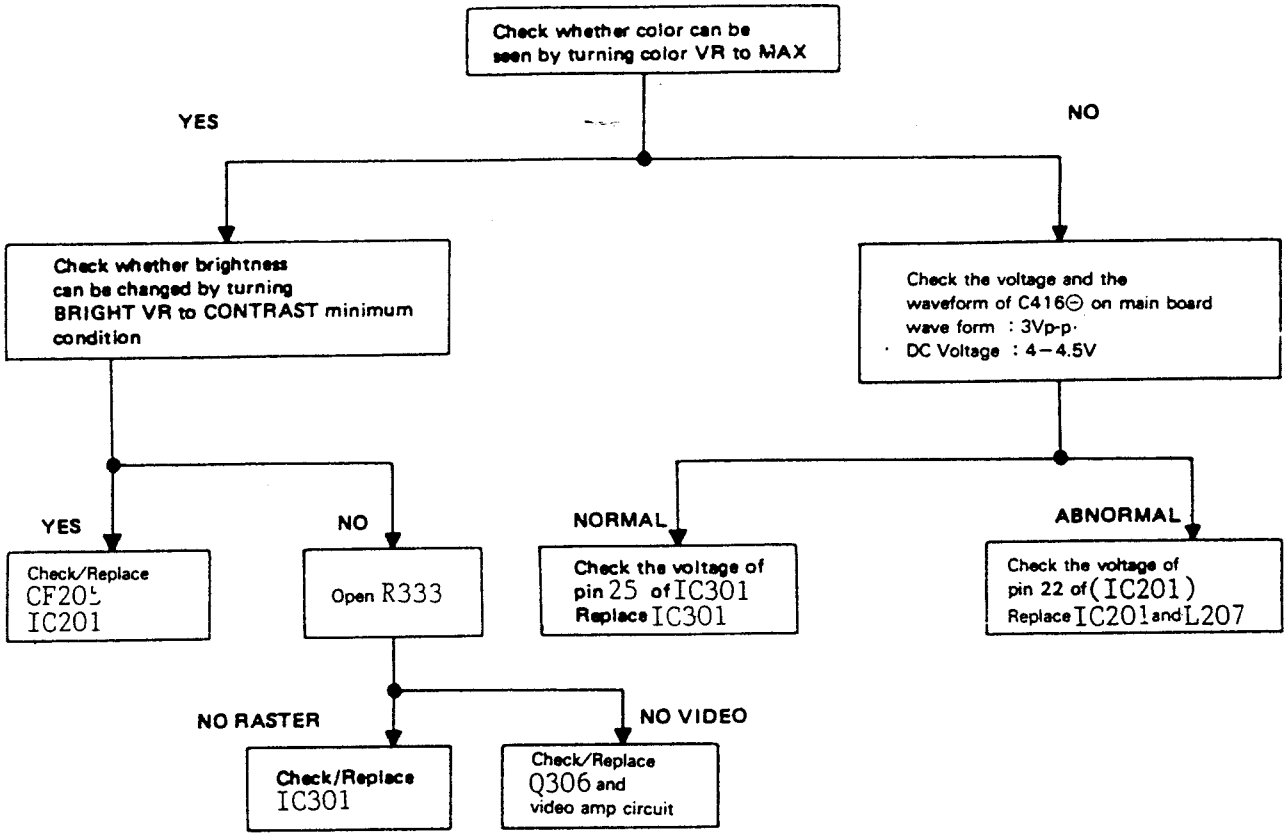
NO RASTER AND NO SOUND



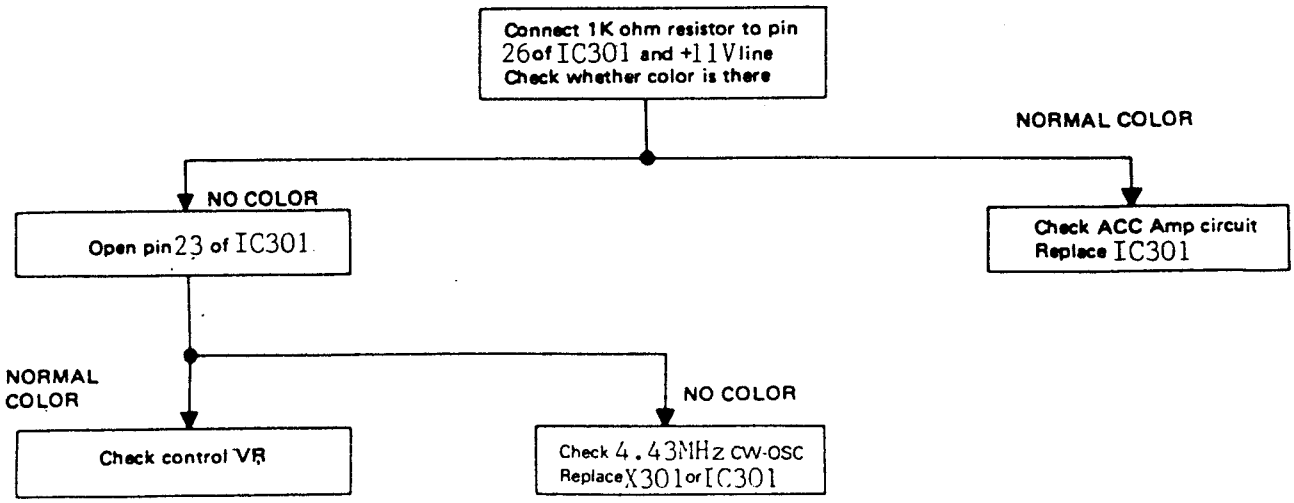
NO RASTER (SOUND OK)



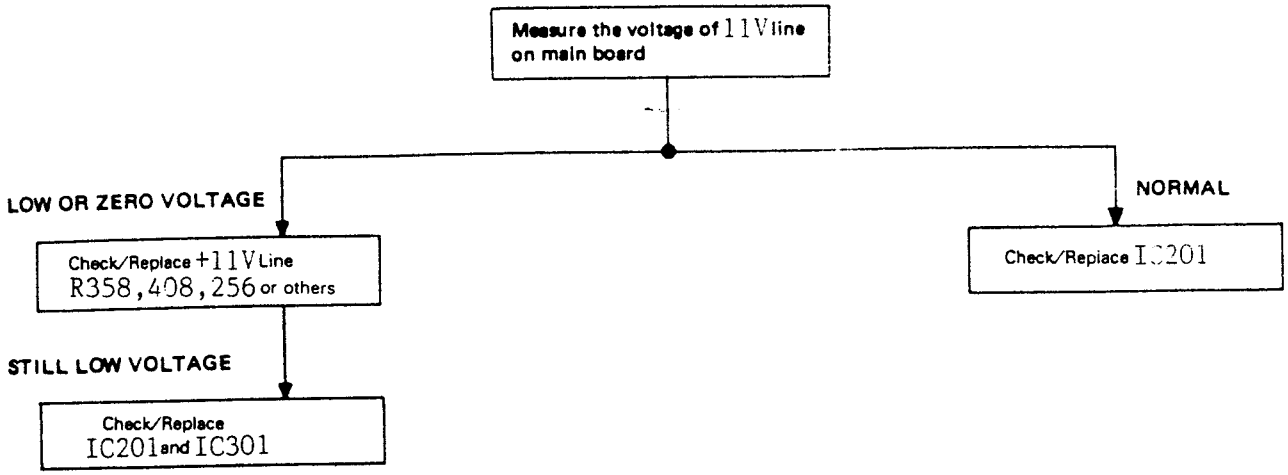
NO PICTURE (RASTER AND SOUND OK)


Check whether color can be seen by turning color VR to MAX
YES
NO
Check whether brightness can be changed by turning BRIGHT VR to CONTRAST minimum condition
Check the voltage and the waveform of C416⊖ on main board
wave form : 3Vp-p
DC Voltage : 4−4.5V
YES
NO
NORMAL
ABNORMAL
Check/Replace CF201 IC201
Open R333
Check the voltage of pin 25 of IC301 Replace IC301
Check the voltage of pin 22 of (IC201) Replace IC201 and L207
NO RASTER
NO VIDEO
Check/Replace IC301
Check/Replace Q306 and video amp circuit

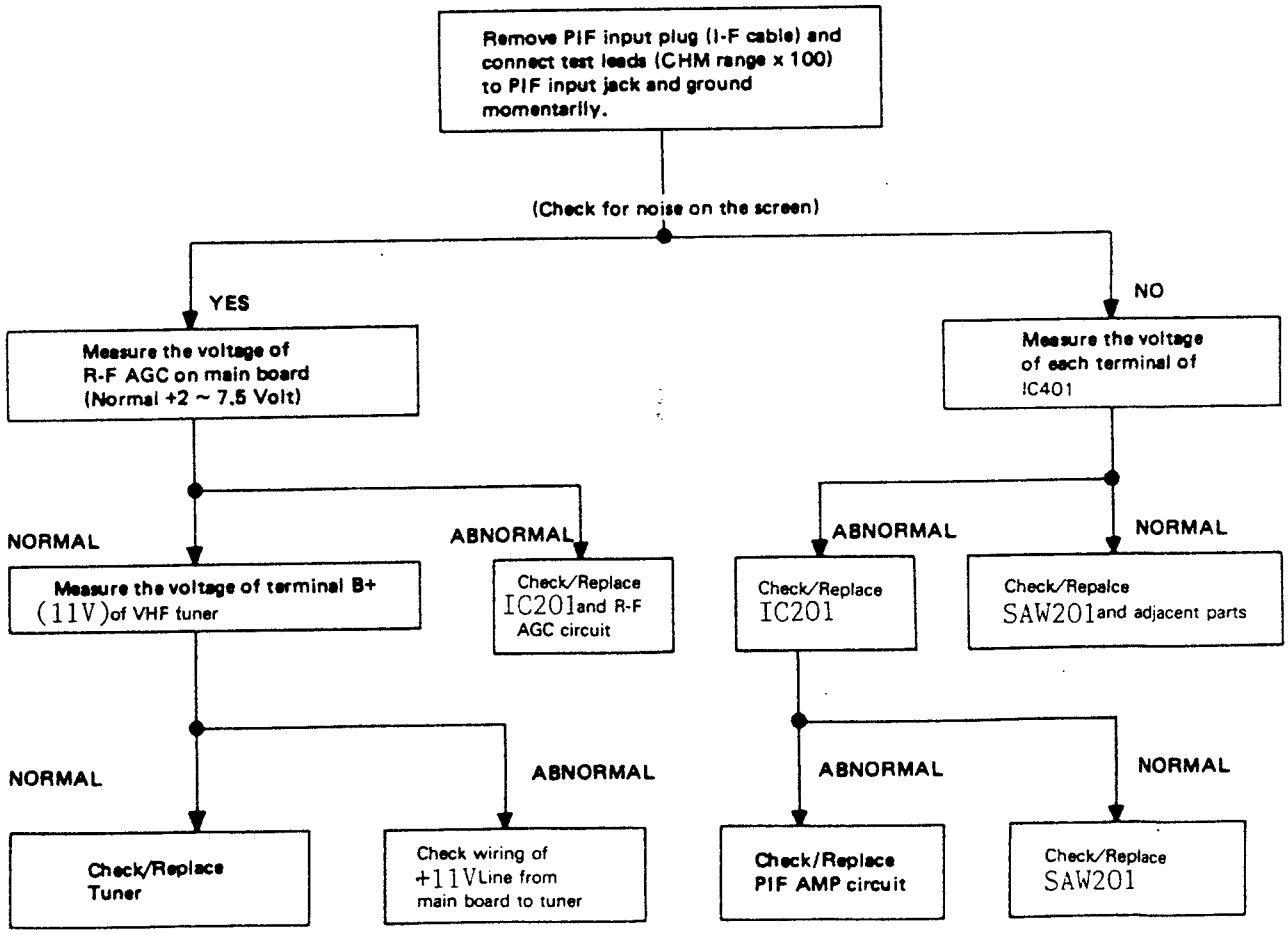
NO COLOR


Connect 1K ohm resistor to pin 26 of IC301 and +11V line
Check whether color is there
NORMAL COLOR
NO COLOR
Open pin 23 of IC301
Check ACC Amp circuit Replace IC301
NORMAL COLOR
NO COLOR
Check control VR
Check 4.43MHz CW-OSC Replace X301 or IC301

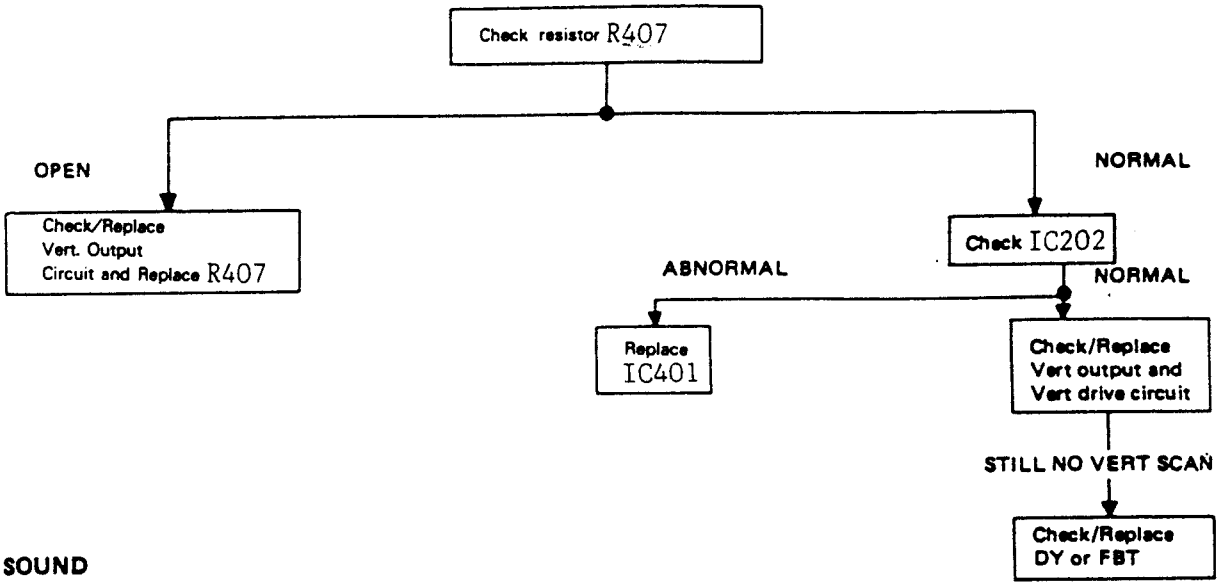
NO RASTER (SOUND NOISE OR WEAK SOUND)


Measure the voltage of 11V line on main board
LOW OR ZERO VOLTAGE
NORMAL
Check/Replace +11V Line R358,408,256 or others
Check/Replace IC201
STILL LOW VOLTAGE
Check/Replace IC201 and IC301

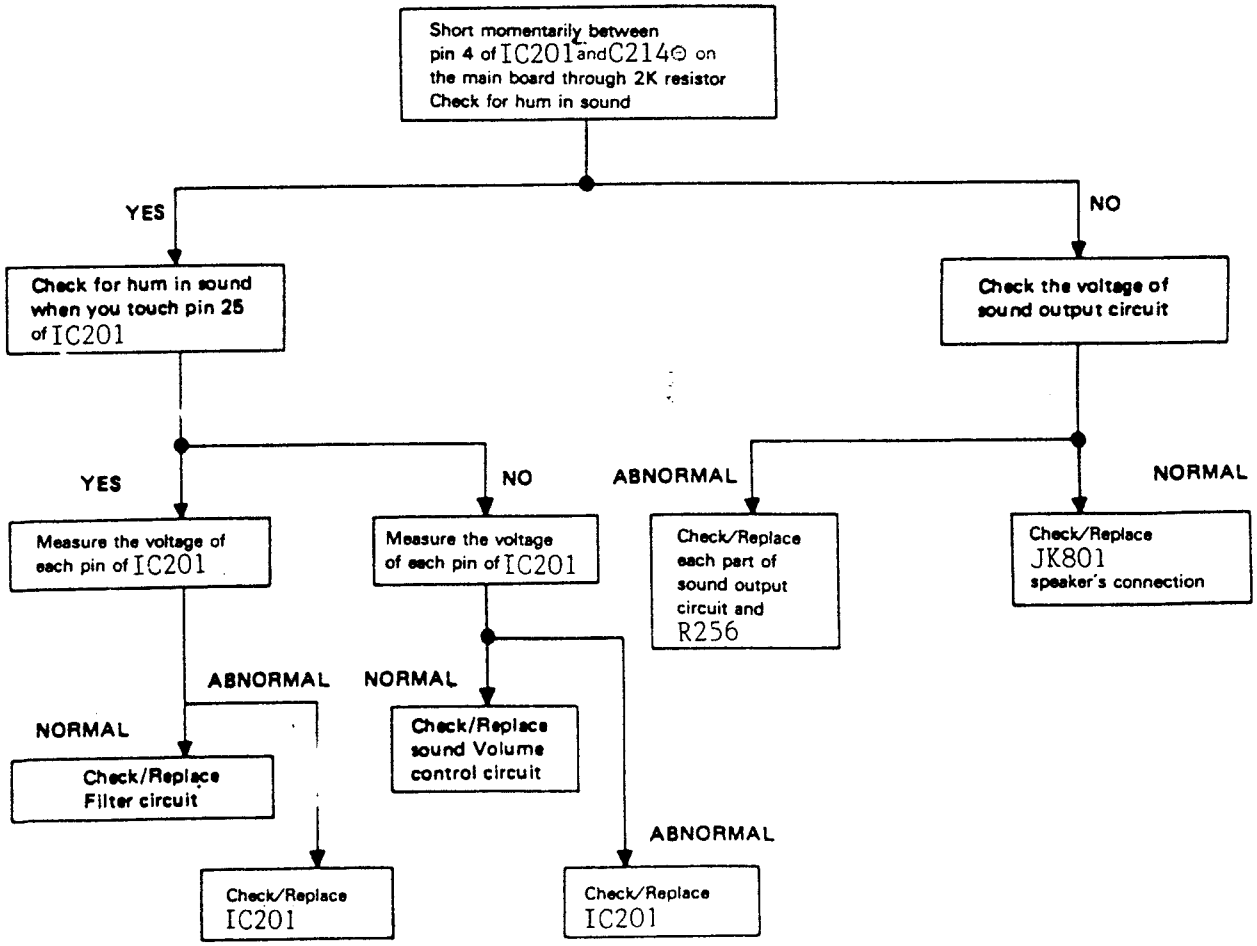
NO PICTURE (RASTER ON) AND NO SOUND


Remove PIF input plug (I-F cable) and connect test leads (CHM range x 100) to PIF input jack and ground momentarily.
(Check for noise on the screen)
YES
NO
Measure the voltage of R-F AGC on main board (Normal +2 ~ 7.5 Volt)
Measure the voltage of each terminal of IC401
NORMAL
ABNORMAL
ABNORMAL
NORMAL
Measure the voltage of terminal B+ (11V) of VHF tuner
Check/Replace IC201 and R-F AGC circuit
Check/Replace IC201
Check/Repalce SAW201 and adjacent parts
NORMAL
ABNORMAL
ABNORMAL
NORMAL
Check/Replace Tuner
Check wiring of +11V Line from main board to tuner
Check/Replace PIF AMP circuit
Check/Replace SAW201

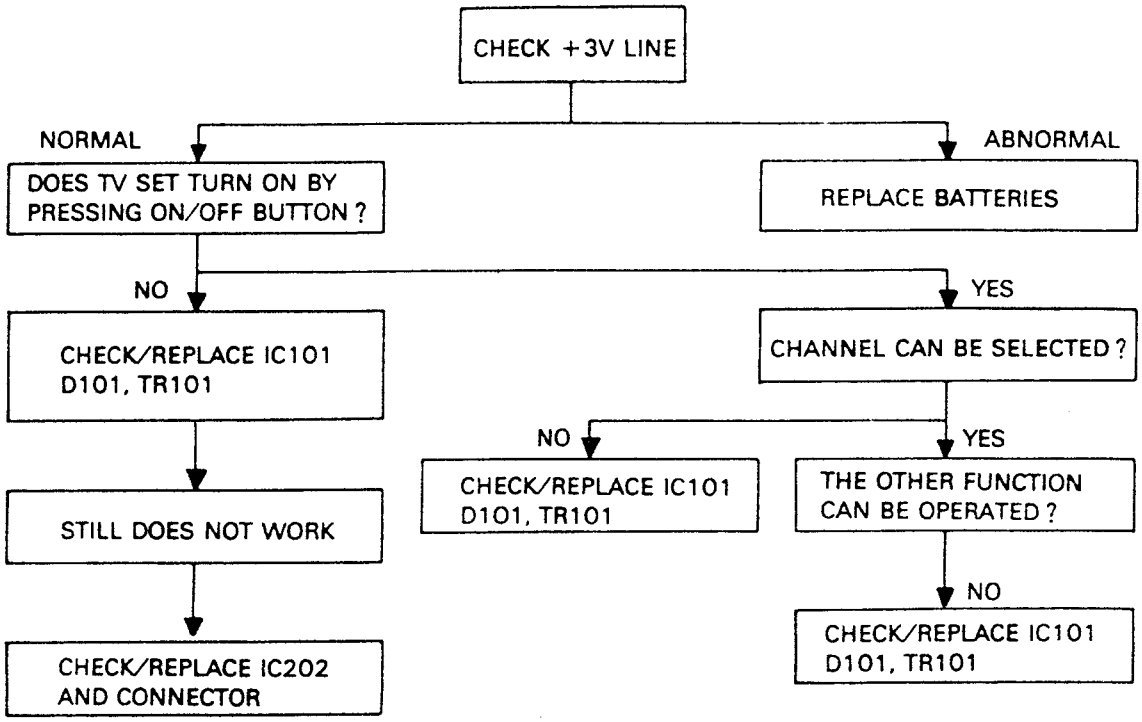
NO VERT SCAN (HORIZONTAL LINE)



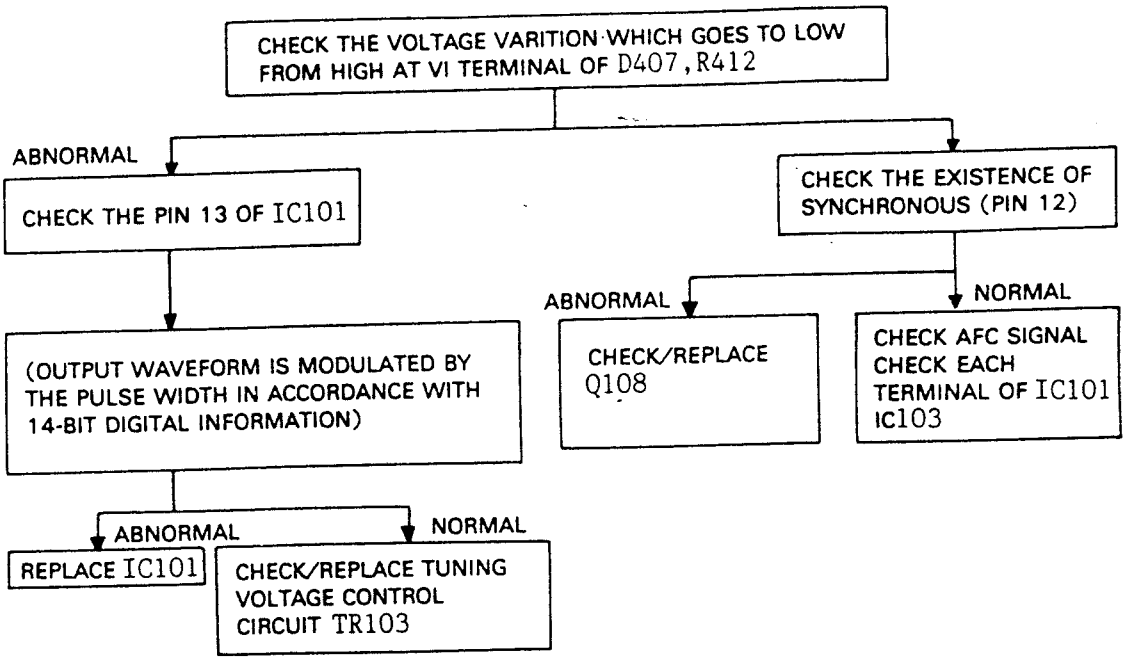
NO SOUND



REMOTE CONTROL DOES NOT WORK



NO AUTOMATIC SEARCH OPERATION


CHECK THE VOLTAGE VARITION WHICH GOES TO LOW FROM HIGH AT VI TERMINAL OF D407, R412
ABNORMAL
CHECK THE PIN 13 OF IC101
CHECK THE EXISTENCE OF SYNCHRONOUS (PIN 12)
ABNORMAL
NORMAL
(OUTPUT WAVEFORM IS MODULATED BY THE PULSE WIDTH IN ACCORDANCE WITH 14-BIT DIGITAL INFORMATION)
CHECK/REPLACE Q108
CHECK AFC SIGNAL CHECK EACH TERMINAL OF IC101 IC103
ABNORMAL
NORMAL
REPLACE IC101
CHECK/REPLACE TUNING VOLTAGE CONTROL CIRCUIT TR103

P A R T S L I S T

LOCATION NO.	CODE NO.	품 명	규 격
PWB FRONT ASS'Y			
R608, 609	101-80284-103	R-CARBON	RD 1/6W T 10K-J
R612	101-80284-105	R-CARBON	RD 1/6W T 1M-J
R604	101-80284-183	R-CARBON	RD 1/6W T 18K-J
R606	101-80284-222	R-CARBON	RD 1/6W T 2.2K-J
R607	101-80284-563	R-CARBON	RD 1/6W T 56K-J
VR602, 603	130-80201-001	V.R	RK09K1130101 B 10K
LED603	230-01000-000	DIODE LED	DL-11S2R
LED601	230-01100-000	DIODE LED	DL-11S2G
LED602	230-01400-000	DIODE LED	DL-11S2Y
LED604	230-01500-001	DIODE LED	DL-11S2RGM
ID601	230-04000-000	DISPLAY LED	ODR-204A
SW606, 608, 609, 610, 611	359-89000-000	SWITCH-TACT	KHH10910
SW601, 602, 604, 605, 607	359-89000-001	SWITCH-TACT	KHH10914
RM601	457-80000-000	REMOCON MODULE	SG-05
R611	101-80204-153	R-CARBON	RD 1/6W P 15K-J
R605	101-80204-332	R-CARBON	RD 1/6W P 3.3K-J
R610	101-80204-822	R-CARBON	RD 1/6W P 8.2K-J
R613	101-80304-471	R-CARBON	RD 1/6W P 470-J
VR604	130-80201-001	V.R	RK09K1130101 B 10K
PWB SOCKET ASS'Y			
R704, 705, 706	101-80284-122	R-CARBON	RD 1/6W T 1.2K-J
R701, 702, 703, 710	101-80284-221	R-CARBON	RD 1/6W T 220-J
R711, 712, 713	101-80484-272	R-CARBON	RD 1/2W P 2.7K-J
R714	101-80484-473	R-CARBON	RD 1/6W T 47K-J
R707, 708, 709	104-80524-103	R-METAL OXIDE	RM 1W 10K-J
L702	105-80405-279	R-FUSIBLE	RF 1/2W 2.7-J
SVR701, 702	124-80021-001	VR-SEMI	V083 B 500
SVR703, 704, 705	124-80021-002	VR-SEMI	V083 B 5K
C701, 702, 703	141-60285-561	C-CERAMIC	CC B 50V T 560PF-K
C704	141-80715-222	C-CERAMIC	CC B 2KV 0.0022uF-K
C706	160-81216-100	C-ELECTROLYTIC	CE04W 250V 10uF
C705	160-81216-479	C-ELECTROLYTIC	CE04W 250V 4.7uF
Q701, 702, 703	213-11228-002	TRANSISTOR	KSC2330-Y
L701	242-01105-101	COIL-PEAKING	100uH-K @6.5
	335-89000-006	CRT SOCKET	DHE-A87-500 (DM500)
V701	201-82001-000	CRT	27DGC85X-TC
L801	247-11000-000	COIL-DEGAUSS	230x175xT65x@0.3 350m/m

LOCATION NO.	CODE NO.	품 명	규 격
SUB ASS'Y			
R801	101-80484-151	R-CARBON	RD 1/2W T 150-J
JK801	333-89000-000	JACK EARPHONE	JW-350N (JACK+NUT)
SW801	359-89000-001	SWITCH TACT	KHH10914
MAIN ASS'Y			
R203, 410, 240, 241	101-80284-101	R-CARBON	RD 1/6W T 100-J
R129, 130, 131, 205, 222, 237	101-80284-102	R-CARBON	RD 1/6W T 1K-J
R242, 315, 319, 326, 336, 254	101-80284-102	R-CARBON	RD 1/6W T 1K-J
R332, 335, 348, 216, 217	101-80284-102	R-CARBON	RD 1/6W T 1K-J
R115, 132, 134, 255, 342, 361	101-80284-103	R-CARBON	RD 1/6W T 10K-J
R218, 101, 06	101-80284-103	R-CARBON	RD 1/6W T 10K-J
R110, 422	101-80284-104	R-CARBON	RD 1/6W T 100K-J
R321	101-80284-105	R-CARBON	RD 1/6W T 1K-J
R350	101-80284-122	R-CARBON	RD 1/6W T 1.2K-J
R329	101-80284-124	R-CARBON	RD 1/6W T 120K-J
R119, 120, 122, 123, 124, 125	101-80284-151	R-CARBON	RD 1/6W T 150-J
R126, 127, 128	101-80284-151	R-CARBON	RD 1/6W T 150-J
R215, 219, 317, 324	101-80284-152	R-CARBON	RD 1/6W T 1.5K-J
R106, 339, 415	101-80284-153	R-CARBON	RD 1/6W T 15K-J
R414	101-80284-154	R-CARBON	RD 1/6W T 150K-J
R209, 327	101-80284-182	R-CARBON	RD 1/6W T 1.8K-J
R338	101-80284-185	R-CARBON	RD 1/6W T 1.8K-J
R112	101-80284-202	R-CARBON	RD 1/6W T 2K-J
R328	101-80284-221	R-CARBON	RD 1/6W T 220-J
R239, 320, 368, 347	101-80284-222	R-CARBON	RD 1/6W T 2.2K-J
R105, 214, 245, 310, 359, 252	101-80284-223	R-CARBON	RD 1/6W T 22K-J
R133, 343	101-80284-271	R-CARBON	RD 1/6W T 270-J
R224, 369	101-80284-272	R-CARBON	RD 1/6W T 2.7K-J
R418	101-80284-273	R-CARBON	RD 1/6W T 27K-J
R211, 220, 228, 354, 355, 356, 360	101-80284-331	R-CARBON	RD 1/6W T 330-J
R340, 351	101-80284-332	R-CARBON	RD 1/6W T 3.3K-J
R102, 212, 401	101-80284-333	R-CARBON	RD 1/6W T 33K-J
R323	101-80284-334	R-CARBON	RD 1/6W T 330K-J
R312	101-80284-335	R-CARBON	RD 1/6W T 3.3M-J
R208	101-80284-390	R-CARBON	RD 1/6W T 39-J
R207, 333	101-80284-391	R-CARBON	RD 1/6W T 390-J
R225, 325, 420, 114	101-80284-392	R-CARBON	RD 1/6W T 3.9K-J
R116, 117	101-80284-432	R-CARBON	RD 1/6W T 4.3K-J
R236	101-80284-433	R-CARBON	RD 1/6W T 43K-J
R213, 349	101-80284-472	R-CARBON	RD 1/6W T 4.7K-J
R417, 419	101-80284-473	R-CARBON	RD 1/6W T 47K-J
R226	101-80284-513	R-CARBON	RD 1/6W T 51K-J

LOCATION NO.	CODE NO.	품 명	규 격
R503	101-80284-561	R-CARBON	RD 1/6W T 560-J
R206, 304, 311, 316	101-80284-562	R-CARBON	RD 1/6W T 5.6K-J
R352	101-80284-563	R-CARBON	RD 1/6W T 56K-J
R118	101-80284-622	R-CARBON	RD 1/6W T 6.2K-J
R253	101-80284-681	R-CARBON	RD 1/6W T 680-J
R201, 346, 202, 505, 504, 111	101-80284-682	R-CARBON	RD 1/6W T 6.8K-J
R244	101-80284-683	R-CARBON	RD 1/6W T 68K-J
R341	101-80284-684	R-CARBON	RD 1/6W T 680K-J
R243, 251	101-80284-750	R-CARBON	RD 1/6W T 75-J
R303	101-80284-822	R-CARBON	RD 1/6W T 8.2K-J
R241, 344	101-80284-823	R-CARBON	RD 1/6W T 82K-J
R413, 409, 527	101-80384-102	R-CARBON	RD 1/4W T 1K-J
R353	101-80384-122	R-CARBON	RD 1/4W T 1.2K-J
R337	101-80384-152	R-CARBON	RD 1/4W T 1.5K-J
R412	101-80384-220	R-CARBON	RD 1/4W T 22-J
R121, 204	101-80384-221	R-CARBON	RD 1/4W T 220-J
R107	101-80384-223	R-CARBON	RD 1/4W T 22K-J
R246, 247	101-80384-271	R-CARBON	RD 1/4W T 270-J
R223	101-80384-560	R-CARBON	RD 1/4W T 56-J
R248	101-80384-821	R-CARBON	RD 1/4W T 820-J
R502, 526, 238	101-80484-101	R-CARBON	RD 1/2W T 100-J
R423	101-80484-102	R-CARBON	RD 1/2W T 10K-J
R249, 250	101-80484-129	R-CARBON	RD 1/2W T 1.2-J
R357	101-80484-151	R-CARBON	RD 1/2W T 150-J
R301	101-80484-220	R-CARBON	RD 1/2W T 22-J
R210	101-80484-330	R-CARBON	RD 1/2W T 33-J
R403	101-80484-391	R-CARBON	RD 1/2W T 390-J
R402	101-80484-399	R-CARBON	RD 1/2W T 3.9-J
R109	101-80484-473	R-CARBON	RD 1/2W T 47K-J
R524	104-80524-330	R-METAL OXIDE	RM 1W M 33-J
R408	104-80524-470	R-METAL OXIDE	RM 1W M 47-J
R407	105-80304-100	R-FUSIBLE	RF 1/4W 10-J
R256	105-80304-100	R-FUSIBLE	RF 1/2W 10-J
R235	105-80404-150	R-FUSIBLE	RF 1/2W 15-J
R302, 406	105-80404-829	R-FUSIBLE	RF 1/2W 8.2-J
R511	106-81054-479	R-CEMENT	RC 15W 4.7-J
RA301	108-80064-001	R-NETWORK	RGLD 4x332J
RA102	108-80064-002	R-NETWORK	RGLD 6x273J
RA101	108-80064-003	R-NETWORK	RGLD 7x273-J
SVR201, 302	124-80241-002	VR-SEMI	H065 B 10K
SVR401	124-80241-004	VR-SEMI	H065 B 500

LOCATION NO.	CODE NO.	품 명	규 격
SVR501	124-80241-005	VR-SEMI	H065 B 5K
C325	140-00281-050	C-CERAMIC	CC CH 50V T 5PF-J
C251	140-00284-100	C-CERAMIC	CC CH 50V T 10PF-J
C235	140-00284-101	C-CERAMIC	CC CH 50V T 100PF-J
C314	140-00284-181	C-CERAMIC	CC CH 50V T 180PF-J
C101, 216	140-00284-220	C-CREAMIC	CC CH 50V T 22PF-J
C343, 344, 345, 412	140-00284-271	C-CERAMIC	CC CH 50V T 270PF-J
C110, 111	140-00284-300	C-CERAMIC	CC CH 50V T 30PF-J
C326	140-00284-470	C-CERAMIC	CC CH 50V T 47PF-J
C354	140-00284-820	C-CERAMIC	CC CH 50V T 82PF-J
C102	140-20284-121	C-CERAMIC	CC SL 50V T 120PF-J
C236	141-60284-391	C-CERAMIC	CC B 50V T 390PF-J
C403	141-60285-561	C-CERAMIC	CC B 50V T 560PF-J
C332	141-60285-681	C-CERAMIC	CC B 50V T 680PF-J
C415	141-60588-102	C-CERAMIC	CC B 500V T 0.001uF-Z
C212	141-80288-102	C-CERAMIC	CC F 50V T 0.001uF-Z
C106, 115, 206, 207, 208	141-80288-103	C-CERAMIC	CC F 50V T 0.01uF-Z
C213, 218, 220, 221, 224, 241	101-80288-103	C-CERAMIC	CC F 50V T 0.01uF-Z
C252, 301, 315, 316	141-80288-103	C-CERAMIC	CC F 50V T 0.01uF-Z
C317, 320, 351, 239	141-80288-103	C-CERAMIC	CC F 50V T 0.01uF-Z
C313	150-00115-104	C-POLYESTER	CQ921M 100V 0.1uF-K
C103, 104	150-00115-224	C-POLYESTER	CQ921M 100V 0.22uF-K
C407	150-00115-563	C-POLYESTER	CQ921M 100V 0.056uF-K
C211	150-00115-683	C-POLYESTER	CQ921M 100V 0.068uF-K
C113, 234, 401, 402, 341	150-00145-102	C-POLYESTER	CQ921M 100V T 0.001uF-K
C308, 310, 312, 404, 414, 227	150-00145-103	C-POLYESTER	CQ921M 100V T 0.01uF-K
C335, 413	150-00145-152	C-POLYESTER	CQ921M 100V T 0.0015uF-K
C209, 214, 307, 328	150-00145-153	C-POLYESTER	CQ921M 100V T 0.015uF-K
C331	150-00145-223	C-POLYESTER	CQ921M 100V T 0.022uF-K
C411	150-00145-273	C-POLYESTER	CQ921M 100V T 0.027uF-K
C122	150-00145-472	C-POLYESTER	CQ921M 100V T 0.0047uF-K
C416, 420	153-00514-473	C-POLYPROPYLINE	CQ921M 630V 0.047uF-J
C504, 228	160-80416-102	C-ELECTROLYTIC	CE04W 16V 1000uF
C109, 249, 302	160-80416-221	C-ELECTROLYTIC	CE04W 16V 220uF
C107, 225, 245, 250, 318	160-80416-471	C-ELECTROLYTIC	CE04W 16V 470uF
C201, 202, 203, 210, 217	160-80446-100	C-ELECTROLYTIC	CE04W 16V T 10uF
C240, 324	160-80446-100	C-ELECTROLYTIC	CE04W 16V T 10uF
C114, 248, 340	160-80446-101	C-ELECTROLYTIC	CE04W 16V T 100uF
C237, 333	160-80446-330	C-ELECTROLYTIC	CE04W 16V T 33uF
C222, 330, 518	160-80446-470	C-ELECTROLYTIC	CE04W 16V T 47uF

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C339	160-80516-102	C-ELECTROLYTIC	CE04W 25V 1000uF
C501	160-80516-222	C-ELECTROLYTIC	CE04W 25V 2200uF
C405	160-80616-101	C-ELECTROLYTIC	CE04W 35V 100uF
C406	160-80616-102	C-ELECTROLYTIC	CE04W 35V 1000uF
C408	160-80616-222	C-ELECTROLYTIC	CE04W 35V 2200uF
C105, 205, 242, 243, 244, 246	160-80746-010	C-ELECTROLYTIC	CE04W 50V T 1uF
C247, 253, 309, 327, 329, 334	160-80746-010	C-ELECTROLYTIC	CE04W 50V T 1uF
C336, 502, 108, 346	160-80746-010	C-ELECTROLYTIC	CE04W 50V T 1uF
C410	160-80746-220	C-ELECTROLYTIC	CE04W 50V T 22uF
C204, 321, 322	160-80746-229	C-ELECTROLYTIC	CE04W 50V T 2.2uF
C215, 311, 323	160-80746-478	C-ELECTROLYTIC	CE04W 50V T 0.47uF
C419	160-80746-479	C-ELECTROLYTIC	CE04W 50V T 4.7uF
C409	160-81216-479	C-ELECTROLYTIC	CE04W 250V 4.7uF
C337	162-80415-100	C-TANTAL	16V 10uF-K
C338	162-80615-010	C-TANTAL	35V 1uF-K
C417	165-80716-479	C-ELECTROLYTIC	CE04W 50V 4.7uF NP-HF
IC103	210-00050-001	IC	LM293
ZD101	210-00200-001	IC	KA33V
IC104	210-00230-001	IC	LA7910
IC202	210-00230-002	IC	M51320P
IC201	210-00400-001	IC	KA2919
IC201	210-00400-002	IC	LA7520
IC301	210-00420-001	IC	M51390ASP
IC401	210-00430-001	IC	KA2131
IC101	210-00500-001	IC	M50431-101SP
IC105	210-00520-001	IC	KIA7031P
Q106, 107, 306, 304	213-10028-001	TRANSISTOR	KSA733-Y
Q201	213-10228-001	TRANSISTOR	KSC1674-Y TAPPING
Q103, 104, 105, 108, 204, 207	213-10228-002	TRANSISTOR	KSC945-Y TAPPING
Q305, 403, 503, 101	213-10228-002	TRANSISTOR	KSC945-Y TAPPING
Q401	213-10328-001	TRANSISTOR	KSD471A-Y
Q502, 206	213-11028-001	TRANSISTOR	KSA928A-Y
Q205, 504	213-11228-001	TRANSISTOR	KSC2328A-Y
Q501	213-33126-001	TRANSISTOR	2SB1135-R
Q402	213-33339-001	TRANSISTOR	2SD1958
D401, 506	216-10000-001	DIODE	IN4003
D101, 102, 103, 104, 105, 106, 107	216-20301-001	DIODE SWITCHING	IN4148 TAPPING
D108, 109, 110, 111, 112, 113	216-20301-001	DIODE SWITCHING	IN4148 TAPPING
D114, 115, 116, 117, 118, 119	216-20301-001	DIODE SWITCHING	IN4148 TAPPING
D202, 203, 301, 302, 303, 311	216-20301-001	DIODE SWITCHING	IN4148 TAPPING

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D504	216-20301-001	DIODE SWITCHING	IN4148 TAPPING
ZD501, 502	216-40000-001	DIODE ZENER	UZ5.6BM
D404, 407	216-60000-001	DIODE	FR106
D408	216-60000-002	DIODE	FR306
D501	216-61000-002	DIODE	FML-G14S
X101	222-00400-001	CERAMIC RESONATOR	CSA400MG
RS301	222-00500-001	CERAMIC RESONATOR	CSB500F9
L401	246-10005-869	COIL-LINEARITY	8.6uH-K (ø10x11)
L302	270-11310-001	IFT	CBL 4.43MHz (7x7)
L301	242-00105-100	COIL-PEAKING	10uH-K ø3.5
L207	242-00105-150	COIL-PEAKING	15uH-K ø3.5
L202	242-00105-558	COIL-PEAKING	0.55uH-K ø3.5
L305	242-01105-101	COIL-PEAKING	100uH-K ø6.5
RA201, 203	333-89000-002	JACK-PHONE	JW-1501 RED
RA202, 204	333-89000-003	JACK-PHONE	JW-1501 YELLOW
SW301	354-89000-001	SWITCH LEVER	JRS-1301
RY501	472-10000-001	RELAY	UT105-12SA
T401	284-00110-001	TRANS-DRIVER	HDT (EI 16m/m 10mH)
T402	285-12200-001	FBT	TCG-30B04
(PAL-B/G)			
R314	101-80204-183	R-CARBON	RD 1/6W P 18K-J
R306	101-80204-391	R-CARBON	RD 1/6W P 390-J
R520	101-80204-153	R-CARBON	RD 1/6W P 15K-J
R521	101-80204-562	R-CARBON	RD 1/6W P 5.6K-J
R530	101-80304-122	R-CARBON	RD 1/4W P 1.2K-J
SVR301	124-80241-001	VR-SEMI	H065 B 2K
C305	140-00214-200	C-CERAMIC	CC CH 50V 20PF
C347, 349	141-80218-102	C-CERAMIC	CC F 50V 0.001uF-Z
C303	141-80218-103	C-CERAMIC	CC F 50V 0.01uF-Z
C503	160-80716-479	C-ELECTROLYTIC	CE04W 50V 4.7uF
D510	216-20300-001	DIODE SWITCHING	IN4148
SAW201	220-00200-002	SAW FILTER	2389A
CF201	221-00410-001	CERAMIC FILTER	SFE5.5MBF
CF205	221-00410-002	CERAMIC FILTER	TPS5.5MB
CF207	223-00410-001	CERAMIC DISCRIMNATOR	CDA5.5MC26
X301	224-00430-001	CRYSTAL	4.433619MHz (18/U)
DL301	254-00440-000	1H DELAY LINE	PDL-644KIP
DL301	225-00440-001	1H DELAY LINE	PID-A

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DL302	226-00402-000	DELAY LINE	DL401P
L203	242-00105-189	COIL-PEAKING	1.8uH-K ø3.5
L303	242-00105-829	COIL-PEAKING	8.2uH-K ø3.5
T301	270-01310-001	IFT	NPAP (10x10 4.43MHz PHASE)
T203, 204	270-11120-001	IFT	PDET (7x7 38.9MHz LLD)
T201	270-11120-002	IFT	PW1 (7x7 1.24MHz BAND)
TU201	451-10300-000	TUNER	GER4A734A (PAL CATV)
DF501	470-33010-001	FUSE	250V 3.15A (5T) SEMKO
DF502	470-33010-002	FUSE	250V 2A (5T) SEMKO

SW-1000 PAL-B/G

NOTES;

THIS SCHEMATIC IS THE LATEST AT TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT ANY NOTICE

1993.04.10